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THE JOURNAL

OF ERW AND MINE ACTION

Issue 13.2 | August 2009



ANNUAL ISSUE

Land Cancellation and Release

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Contact

Please direct all *Journal* submissions, queries and
subscriptions/CFP requests to:
Lois Carter Fay, Editor-in-Chief
Mine Action Information Center
Center for International Stabilization and Recovery
James Madison University
800 S. Main Street, MSC 4902
Harrisonburg, VA 22807 / USA
Tel: +1 540 568 2503
Fax: +1 540 568 8176
E-mail: editormaic@gmail.com



Letter from the Editor



Welcome to our first annual issue of *The Journal of ERW and Mine Action*. We are excited to present this issue, which covers one topic, Land Cancellation and Release, in a bit more depth. We hope you enjoy it.

You'll notice that the layout of this issue is a bit different. We wanted to set it apart from our normal issue. In addition to having longer articles, we have increased the typeface size and printed the magazine two-color instead of full color. Some of the design changes will continue into our fall issue. We have also added a new feature with this issue: a glossary of common terms used in many of our articles. It is currently a fairly short list, though it may become more robust in the future as necessary. While not meant to be all-inclusive, the list takes the place of many of the endnotes we previously used repeatedly, and we hope it provides the information in a more reader-friendly format. Please have a look at the list of terms on page 60.

Please let us know what you think about the articles, design or any other issue related to *The Journal*. As always, we look forward to your feedback.

May peace prevail on Earth,
Lois Carter Fay
Editor-in-Chief, *The Journal of ERW and Mine Action*
editormaic@gmail.com

Contributors

Håvard Bach
Antonio Belchior
Kjell Björk
Emanuela Elisa Cepolina
Charles Downs
Juliane Garcia
Robert Keeley
Parviz Mavlonkulov
Marie Nilsson
Stephen Pritchard
Virginie Rozès
John E. Stevens
Matteo Zoppi

The Fine Print

The Journal of ERW and Mine Action Editorial Board reviews all articles for content and readability, and it reserves the right to alter articles for readability and space concerns. Every effort is made to assure accuracy and to maintain the integrity and meaning of the text. Manuscripts and photos will not be returned unless requested.

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A Conversation about Land Cancellation and Release with H. Murphey "Murf" McCloy

by John E. Stevens [PM/WRA]

Land Cancellation and Release in mine action is looked at by many experts as the next logical step to the safe and time-effective return of mined areas. This interview examines the benefits of the land-release method and addresses its criticisms.

Humanitarian mine action is poised for another step forward via the Land Cancellation and Release approach. Unlike previous mine-action developments that were largely systemic (e.g., Landmine Impact Surveys) or technical (for example, the HSTAMIDS mine detector¹), Land Cancellation and Release is essentially conceptual. It balances surveys with risk-management assessments in order to speed the rate at which Suspected Hazardous Areas can be deemed safe and returned to productive use. In some

cases, Land Cancellation and Release may occur without *any* clearance.

Since the term *humanitarian demining* was introduced by American and other practitioners (United Kingdom, France, etc.) or people in Afghanistan in late 1988, its doctrines and practices have matured as it spread to other conflict-affected countries. Many of its technical approaches can be traced to World War II and the extraordinary post-war clearance of mines and explosive remnants of war that rendered western Europe largely impact-free a mere five years later. What distinguished *humanitarian demining*—later expanded to the more holistic *humanitarian-mine action*—in the latter half of the 20th century from its World War II roots was an approach that sought to calculate precisely the scope and nature of the problem in advance, followed by more rigorous clearance and quality assurance. This approach, ultimately codified in the first edition of International Mine Action Standards in 2001, assured that mine-affected populations could occupy their lands again safely and that deminers would minimize risk to themselves.

The problem was that mine clearance that adhered to IMAS inevitably increased demining costs and times. IMAS' high standards often introduced tensions between those donor nations, such as the United States, which encouraged IMAS at every step, and mine-affected nations eager to speed economic development and resettlement of populations while accepting greater



A Vietnamese Army Engineer Officer, trained to conduct Landmine Impact Surveys, interviews villagers in a hamlet in Quang Binh province, north of the old demilitarized zone, about the locations of ERW. This interview took place during the final stages of a multi-million dollar Landmine Impact Survey in Vietnam that was funded by the U.S. Department of State's Office of Weapons Removal and Abatement. PHOTO COURTESY OF THE AUTHOR

human risk. I must confess that when I was Program Manager for Vietnam, I insisted that IMAS be followed to the letter.

Land Cancellation and Release will change mine action again. To learn more, I approached my colleague, H. Murphey "Murf" McCloy, a humanitarian-demining

pioneer. Among other accomplishments, McCloy started the first United States humanitarian-demining program in Bosnia and Herzegovina in 1996 in cooperation with United Nations mine-action authorities. This program morphed into internationally supported programs in several Balkan countries that saved lives and contributed to regional confidence-building. Our conversation about Land Release and Cancellation follows.



At the time this photo was taken in Azerbaijan, the hills in the distance were mined. PHOTO COURTESY OF DEBORAH NETLAND, PM/WRA



This verdant grape vineyard in Afghanistan's Shomali Valley was devastated by fighting and infested with landmines and ERW. Thanks to Roots of Peace, through support from U.S.-government grants and private donors, the land was demined and safely replanted, and is again producing delicious grapes for consumption in the region. PHOTO COURTESY OF ROOTS OF PEACE

Stevens: What exactly is *land release*?

McCloy: The latest draft of IMAS 08.20 (*Land Release*), approved by the IMAS Review Board and that should soon be published, defines it as "... the process of applying all reasonable effort to identify or better define Confirmed Hazardous Areas (CHA) and remove all suspicion of mines/ERW through Non-technical Survey, Technical Survey and/or clearance using an evidence-based and documented approach."²

Stevens: What role do surveys play in the land-release process?

McCloy: Surveys play a central role in the land-release process, for good and for bad. On the "good side," well-conducted surveys lay the groundwork for efficient and cost-effective mine action by narrowing the size of

the areas that are genuinely hazardous and that need to be subjected to expensive, full-clearance measures. Doing so has two major benefits. First, scant demining resources are expended only on land that contains explosive threats. Second, some areas may be returned to safe use through the application of much less expensive survey measures alone—Non-technical Survey being the least costly, and Technical Survey being more costly but much less expensive than full clearance.

On the other hand, inaccurate or inadequate surveys can distort the mine/ERW picture. This can result in an exaggeration of the explosive threat in an area, causing unnecessary expenditure of clearance resources. Even worse, a "false clear" conclusion can divert the application of more definitive survey/clearance measures from potentially dangerous ground,

thereby unnecessarily putting land users at risk.

Stevens: Given the need by donor nations, nongovernmental organizations and individual contributors to prioritize their limited funding, how do mine-action programs determine the appropriate "end state" to be reached?

McCloy: Programs don't determine end state; stakeholders do. The decision varies with the stakeholders. The key stakeholders are the national authorities of a mine-/ERW-affected nation and the international donors

that support the mine-action efforts of those authorities with funding and other assistance.

For the national authorities, the end state may be that point at which the explosive threat to the population has been reduced to impact-free or mine-free status, both of which involve a commitment to a long-term effort. The impact-free approach that the United States pursues envisions an end state in which "the last citizen has been rendered safe from the effects of mines." The mine-free end state, favored by advocates of the Ottawa Convention ban on anti-personnel mines, envisions victory "when the last mine (anywhere) has been cleared/destroyed."

For the foreign-government (donor) stakeholder, the end state can take a variety of forms, depending on the resources that the donor has, and the donor's assessment of the needs and chances of success (defined in the donor's terms) in entering into a collaborative effort with the host nation and other international supporters.

Each stakeholder must determine the appropriate end state for itself, whether it is pegged to the achievement of Ottawa Convention commitments, such as eliminating all mines within the national territory, or to shorter-term, pragmatic capacity-building goals (as is the case of most U.S. humanitarian mine-action assistance programs). These goals are oriented toward creating a host nation's independent capability to plan, manage and execute its national program with or without external assistance.

The only stakeholder that is guaranteed to "be there" until the "last mine is cleared" end state is the mine-affected nation itself. Other stakeholders' end states will vary in scope and duration as dictated by their individual political and humanitarian goals for the host nation concerned and by their available resources.

Stevens: Can these end states be defined early in the process to make it feasible to determine successful completion?

McCloy: Stakeholders/donors can and should establish their initial end state during the mobilization phase while they are collecting information on the situation in the host nation and marshalling assets to bring to bear on the problems known to exist. Planning an end state gives focus and purpose at the outset to the coordination and execution of the assistance that will be provided. This end state represents a goal to be achieved; objectives and other concrete measures of effectiveness can be derived and measured using this goal.

Initial end states are not immutable; an initial approach to mine-action assistance can be revised. Conditions can change within the political, socioeconomic security framework of a post-conflict country, as can the end-state goals of the individual donors/stakeholders. The important thing is to have an end state in mind from the start. Making changes from a known point of reference is easier and more economical in terms of the expenditure of time, resources and political capital. It also provides a useful launch point from which to elicit and gauge cooperative efforts from host-nation authorities and other stakeholders.

Stevens: What is an acceptable level of residual risk?

McCloy: An acceptable level of residual risk is what the respective national mine-action authorities say it is. Residual risk, as defined in IMAS 04.10 *Glossary of Terms* (second edition, 1 January 2003), is: "In the context of humanitarian demining, the risk remaining following the application of all reasonable efforts to remove and/or destroy all mine or ERW hazards from a specified area to a specified depth."³

According to the draft IMAS 08.20 *Land Release*, in the process of determining when land can be released from suspicion all reasonable efforts is “the level of effort required to achieve the desired level of confidence that the land is free of mines/ERW.”² Depending on the evidence of explosive contamination gathered from the survey techniques applied to a particular piece of ground, “all reasonable efforts” can vary from “no further efforts are required to release the land” to “more surveying is required to make a final determination,” all the way to “full clearance measures must be applied to this land before it can be returned to safe use.” It is the responsibility of the various national mine-action authorities to develop a national land-release policy, to prepare and publish standards and guidelines governing the land-release program, and to include a definition of the criteria for “all reasonable efforts” for their respective countries.

Stevens: Can people be confident that landmines/ERW in a community have deteriorated sufficiently to eliminate the risk of explosion?

McCloy: No. Landmine deterioration is a function of many variables, including those induced by local soil conditions, depth of burial, exposure to sunlight and other weather phenomena, type of construction (hermetically sealed; plastic, metal or wooden casing; firing mechanism, etc.), composition of the explosive charge, age of the mine, time in the ground, and other factors.

There is no set of conditions that will guarantee that all mines, even of the same type, will deteriorate to a harmless state. In fact, it is possible for mines under certain conditions to deteriorate to an unstable state that renders them more sensitive/susceptible to unintended detonation than when originally manufactured.

Stevens: Can people be confident that all of the landmines/ERW have been removed?

McCloy: No. In spite of the best efforts of human deminers, mine-detecting dogs and machines, there is always the possibility that an area formerly contaminated with mines/ERW can contain some residual risk even after full clearance has been conducted properly. The methods and procedures prescribed in the clearance-related IMAS are designed to ensure the removal or destruction of all mine and ERW hazards within a specified area to a specified depth. There are no 100-percent guarantees.

What the members of a mine-/ERW-affected community *can* be confident in is that *if* a thorough, well-documented and supervised process has been undertaken (i.e., all reasonable effort has been expended), this process will reduce the residual risk to a “tolerable level” (i.e., a level of threat low enough that they and other stakeholders are convinced that the area can be returned to safe use).

This confidence is generated in the local population

by the demonstrated reliability over time of the national mine-action authority, mine-action center and local/international demining organizations to return areas to safe use and to respond quickly and effectively in those cases where additional threats are found in areas formerly considered cleared or free of mine/ERW threats.

Stevens: When does the need to use the land make the risk worth taking?

McCloy: The risk is worth taking when the national mine-action authority and other stakeholders, particularly the local/host-nation stakeholders, feel that it is safe enough to use.

There is a movement by Ottawa Convention adherents and by some international funders of humanitarian mine action to expand the use of the full spectrum of land-release methodologies to achieve a more expedient and cost-effective release of areas once deemed to be mined. In a world of limited resources, lower-cost measures such as Non-technical and Technical Survey are desirable alternatives to the full-clearance option. Mine-affected Ottawa States Parties are encouraged to adopt land-release policies that include all three methods.

Ultimately, however, the disposition of mines/ERW within the national territory of a mine-affected state is the responsibility of the nation itself. Consequently, this is a decision for national authorities, with the national mine-action authority responsible for developing a national land-release policy and relevant standards and procedures, hopefully in concert with other stakeholders, to include international donors and the local civilian community.

The international community can encourage mine-affected countries to adopt a comprehensive land-release program, but it is up to the individual mine-affected countries themselves to decide whether to do so, and where and how such operations will be carried out.

Stevens: Isn't Land Cancellation and Release a sham that enables donor nations and mine-affected nations alike to put a stamp of approval on sloppily done work, or proceed on assumptions that are based on questionable surveys that could endanger lives in order to save money?

McCloy: Land Cancellation and Release is neither a sham nor an internationally-orchestrated cost-cutting measure that sacrifices the safety and well-being of civilian populations. It is instead a highly developed form of risk management that serves to offset the problems associated with shrinking donor funding for mine action worldwide. It does this by achieving operational economies of scale through database purification, along with the release of land through the application of survey and clearance methodologies appropriate to the threats confirmed through adequate and accurate survey techniques.

There is no relaxing of standards regarding the level of evidence required to tailor survey or clearance work to the specific tasks, nor is there any lessening or “watering down” of the standards to which survey and clearance operations must be performed. The aim is to employ full clearance (the most costly) resources only on genuinely hazardous areas identified through accurate and adequate survey techniques.

The standards/guidelines set forth in the newly adopted land-recovery-associated IMAS (IMAS 08.20 *Land Release*;² IMAS 08.21 *Non-technical Survey*;⁴ and IMAS 08.22 *Technical Survey*⁵), in conjunction with the long-standing IMAS 09.10 *Clearance Requirements*⁶ (published in 2003) set forth procedures and methodologies that, if properly codified, published and enforced by the respective national mine-action authority, will return land to safe use at a lower cost with a tolerable level of risk that is acceptable to all stakeholders, including the local civilian community.

Land Cancellation includes such activities as purging the national mine/ERW database of invalid (redundant/incorrect) Suspected Hazardous Area entries as well as releasing land for safe use through a combination of Non-technical Survey, Technical Survey, and/or full-clearance operations.

Stevens: The Ottawa Convention ban on anti-personnel landmines calls for the total elimination of landmines. Does Land Cancellation and Release undercut the goal of that ban?

McCloy: The Ottawa Convention process has evolved into a position that reconciles the “total elimination” position previously accepted by all States Parties with the cost-effective “all reasonable efforts/tolerable risk” approach of the Land Cancellation and Release process.

Annex C of IMAS 08.20 *Land Release* reads: “Article 5.2 of the Mine Ban Convention [commonly known as the Ottawa Convention] requires each State Party to ... make every effort to identify all areas under its jurisdiction or control in which anti-personnel mines are known or suspected to be emplaced and [to] ensure as soon as possible that all AP mines in mined areas under its jurisdiction or control are perimeter-marked, monitored and protected by fencing or other means, to ensure the effective exclusion of civilians, until all AP mines contained therein have been destroyed.”²

The sophistry involved in moving from the bottom-line position of destroying all anti-personnel mines to accepting the Land Cancellation and Release process is that the statement above implies *an obligation* on the part of States Parties to the Convention to ensure that mined areas under their control are accurately surveyed,

and then perimeter-marked by fencing or other means.

The final connection between “destroying all mines” and using “all available methods” (i.e., Non-technical Survey, Technical Survey and clearance) to release land in a more cost-effective manner is provided by a paper titled “Applying All Available Methods to Achieve the Full, Efficient, and Expedient Implementation of Article 5,”⁷ endorsed at the Ninth Meeting of States Parties in November 2008.

Two of the key conclusions of this paper are that, first, the States Parties acknowledge that land reassessment and release through non-technical means, when undertaken in accordance with high-quality national policies and standards that incorporate key principles highlighted in this paper, is not a shortcut to implementing Article 5.1 but rather a means to more expediently release with confidence areas at one time deemed to be mined.

Second, three main activities can be undertaken to assess and, where applicable, to release land that has been previously identified and reported as part of a “mined area”: Non-technical means, Technical Survey and clearance.

Note that it is the responsibility of the national authorities of the mine-affected countries to make this work. This responsibility is also reflected in the duties of the national mine-action authority as set forth in the land-release-related IMAS.

Annex C of IMAS 08.20 states that while proponents of the Ottawa Convention have tried to make a similar connection between survey and the elimination of mines/ERW for the Convention on Certain Conventional Weapons (to which the United States is a State Party), the implied connection between “all reasonable precautions” and “survey” is not nearly as compelling.

Stevens: At the humanitarian mine-action workshop hosted by China in April 2004, several Western demining organizations intimated that Chinese demining procedures at the time were not up to IMAS standards, imperiled both deminers and the affected populations, and were harmful to the environment. The Chinese defended their approach as “practical, reliable, simple, and low-cost—and particularly suited for mine-clearance in developing countries.” This approach was rejected by the Western participants, in part because it implied that the lives of people in developing countries were not as worthy as those in richer countries. Doesn't the new Land Cancellation and Release IMAS essentially echo the Chinese approach?

McCloy: While the Chinese demining procedures were definitely low-cost, they were not in accordance with the IMAS. In the case of the Land Cancellation

Reconciling Real-world Situations with Formal Land Cancellation and Release



PHOTO COURTESY OF THE HALO TRUST

The three scenarios below help to explain some of the dilemmas mine-action authorities face when implementing Land Cancellation and Release policies.

Sri Lanka. The above photo depicts a freshly cultivated field on the Jaffna Peninsula, directly adjacent to some red minefield demarcation stakes. The area was cleared in one day. When the deminers arrived the next day, a farmer had already plowed to the red stakes. In this case, one could say that the farmer conducted *de facto* quality assurance/quality control. What is the Sri Lankan national mine-action authority to do?

Angola. Here is a hypothetical scenario drawn from real situations: A key dirt road connects two towns in Angola. It was reportedly mined and the adjoining areas may well be mined. Yet, for the past year residents have used this road with trucks, 4x4s and animal-drawn carts without suffering any injuries or deaths from mines. Should the Angolan national mine-action authority declare victory in this area and focus its demining resources exclusively on other hazardous areas?

Cambodia. Here is another hypothetical situation inspired by actual scenarios: One or more polygons on a Landmine Impact Survey of a district in Cambodia indicate that the areas in question are mined. Yet, for the last three years farmers in this allegedly mined area have been intensively cultivating their rice paddies and have not suffered any injuries or deaths.

Should the Cambodian national mine-action authority still make an effort to survey the land before declaring it safe, or should they use their limited resources to clear other land that is definitely mined?

In all three cases, the answers to the real-world situations described above would have to be provided by the countries' national mine-action authorities. The national mine-action authorities could all release areas "empirically cleared" based on the evidence available. There must still be a process undertaken to define the actual limits of the areas declared tolerably free from the risk of mines.

The use of the land without adverse consequences in the three examples cited above does provide evidence (and here I stress evidence, not proof) that these areas contain no explosive threats and may not need to be subjected to full clearance in order to be returned to safe usage. Nevertheless, these areas still need to be accurately defined in terms of grid coordinates and turning points (like any other piece of cleared ground), and officially released only after being subjected to the land-release processes and procedures specified by the national mine-action authority of the respective country.

To further illustrate, a national mine-action authority may feel that the fact that a farmer has plowed certain ground without encountering a mine may be due more to luck than to the actual absence of explosive threats, and, therefore, would require more stringent (and costly) final proofs to release land plowed only once, but would require less costly measures for land that has been plowed two times or more. Similarly, while the roadbeds of well-traveled sections of road may be considered for release short of full clearance, the fact is that there is much less compelling evidence that there are no explosive threats present on the adjacent slopes. Consequently, the roadbeds may be defined and released after less costly and time-consuming measures while the accompanying verges of these same sections of road may require much more work to achieve release. In the end, it will all depend on the proofs/procedures specified by the national mine-action authority. Given the same conditions in different countries, the proofs and procedures could be different in each situation, depending on how the national authorities view "tolerable risk."

tion and Release process being espoused through the new IMAS, there are definite standards that cover this process and acknowledge the potential residual risk to affected populations while presenting procedures/methodologies to keep the risk at a level acceptable for all stakeholders (tolerable risk), including the civilian population.

If I were a local that needed the land to feed my family, I would probably feel the same way. Above all, I think that the risk management inherent in the land-release process is far superior in terms of lower risk/higher safety than do-it-yourself village demining (or *informal demining* as it is now called), which is what many inhab-

The Chinese level of risk was risk defined by default, or lack of adherence to appropriate international standards.

The Chinese level of risk was risk defined by default, or lack of adherence to appropriate international standards. The new IMAS land-release level of risk is a function of conscious design with the savings in time and money carefully weighed against safety, and it is contingent on the thoroughness of the various survey and clearance processes.

Stevens: Which would you rather visit: a known mined area that had been cleared to traditional IMAS standards, or a once-suspected mined area that had simply been released following a data-collection exercise with accuracy and thoroughness certified by the host government but unknown to you?

McCloy: All things being equal, naturally I would feel confident that the residual-risk potential would be lower for an area subjected to full clearance than for that released through survey alone. However, if I trusted in the abilities of each link in the mine-action chain, I would not hesitate to visit either area you described, although I would probably be more "situationally aware" in the survey-released area.

itants of threat areas must resort to because of the needs-resources priorities gap that delays mine action for years.

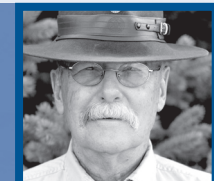
The more I know about mine action—to include the role and effectiveness of the national mine-action authority and the operational reputations of the mine-action center and the demining organizations performing the survey/clearance work—the more confident I am about where I can safely venture. ♦

See Endnotes, page 62



John Stevens is a career civil servant at the U.S. Department of State who has publicized the U.S. Humanitarian Mine Action program since 1999. His prior exposure to landmines was limited to being taught to use Claymores while a paratrooper in the early 1970s, and in avoiding mines while an Observer with the Multinational Force and Observers in the Sinai in the mid-1980s. Stevens managed PM/WRA's mine-action program in Vietnam for two years before attending the National War College, from which he graduated in June 2009, with a master's degree in national security strategy.

John E. Stevens
Foreign Affairs Officer
Office of Weapons Removal and Abatement
Bureau of Political-Military Affairs
U.S. Department of State
SA-3 Suite 6100
2121 Virginia Avenue, NW
Washington, DC 20522 / USA
Tel: +1 202-663-0086
Fax: +1 202-663-0090
E-mail: StevensJE@state.gov
Web site: <http://www.state.gov/t/pm/wra>



H. Murphey "Murf" McCloy, Jr. retired as a U.S. Marine Colonel in 1993. He subsequently served his initial postings in the humanitarian-demining field with the United Nations in Somalia (UNOSOM II) and Angola (UNAVEM) before joining the U.S. Department of State as the U.S. Demining Coordinator in Bosnia and Herzegovina. He became the State Department's Senior Demining Advisor in 1998, a position he held until his retirement in November 2007. McCloy continues to work part-time for the Office of Weapons Removal and Abatement from his home in Colorado, where he is honing his "professional grandparenting skills" on granddaughter Nora under the watchful eye of wife Charlotte.

Harry Murphey McCloy, Jr.
Post-conflict Recovery Expert
Office of Weapons Removal and Abatement
Bureau of Political-Military Affairs
U.S. Department of State
Washington, DC 20522 / USA
E-mail: McCloyM@state.gov

Survey and Land Release: Lessons from Recent Country Experience

by Charles Downs [Downs Consulting]

Suspected Hazardous Areas bring fear to local communities and hinder socioeconomic development, but in most cases the majority of the land contains no mines at all. Survey for land release may put an end to this fear, and it allows for an accelerated solution to the landmine problem.

Mines kill; clearing mines saves lives. With the dramatic fall in the number of new victims in most mine-affected countries, however, the primary justification for mine action today is to support development. Suspicion that land is mined interferes with community and national economic development, poverty reduction, reestablishment of communities, and private-sector investment. Suspected Hazardous Areas reflect community fear. Land release supports development by eliminating this fear.

Unnecessary Practices

The total area suspected of being mined is too large for the resources available for clearance throughout the world. The process of fully clearing all such areas is slow and expensive, and it requires many decades to complete. Most suspect land has no mines; in my experience, less than 5 percent of SHAs prove to have any mines in most countries, and many clearance operations find none at all. Two-thirds of the clearance tasks concluded by Handicap International–Mozambique in 2008 found no mines/explosive remnants of war.

Landmine-hazard information is essential for planning by community and development operators—if their project crosses through a suspected-mined area, they want it cleared. For government ministries and nongovernmental organizations, this may include specific plots of land where they plan to build a school, market or road. For private investors, this may include land to provide access to or expand factories, commercial farms, natural-resource mines or oil fields. A poor farmer may decide to accept the risk directly. A commercial contractor may not be able to obtain insurance for its work until the land is certified safe. In such sit-

uations, a land-release approach will provide a more rapid response to development-operator needs, while requiring fewer resources and leaving more resources for other tasks. For example, a majority of Mines Advisory Group–Cambodia tasks support international NGO community-development projects. The NGOs want to be certain that there are no mines in their project sites, and they insist on clearing the land. While their desire for “peace of mind” clearance is understandable, it results in poor use of resources. In 2007, in the absence of a nationally accepted land-release approach, over 50 percent of MAG’s clearance tasks produced no mines.

Surveyors frequently respond to community concerns and uncertainty by identifying SHAs where the community fears them to be, even though more complete information might indicate there was no hazard.

Until recently, it was customary for Norwegian People’s Aid–Angola to clear 100 percent of any area identified as suspected of containing landmines. This policy resulted in the clearance of many areas without mines and a low ratio of mines found to hectares cleared. Since early 2008, NPA (with the support of the Geneva International Centre for Humanitarian Demining) has been developing a land-release approach to Technical Survey in Angola.

According to a concept paper by NPA–Angola, “In the past, no risk-management assessment was ever made to evaluate this risk, and the alternative option

Extensive Technical Survey for resettlement of internally displaced persons, Zobjug, Azerbaijan, released after mechanical preparation and visual inspection.
PHOTO COURTESY OF ANAMA

chosen was to manually clear ever-increasing areas of land, almost always without finding any mines. This ‘safe’ option was in fact a wasteful use of mine-clearance resources. These resources, which are often scarce, should be used to the benefit of the local people with actual landmine problems. Land-release concepts similar to the model used by NPA will ensure an efficient clearance of minefields and a higher percentage of land returned safely to society.”¹

Landmine Impact Survey

Land release does not save lives directly, since the land released generally had no evidence of mines in the first place. Clearing land without mines is an expensive way to enable development and is a poor use of resources. It is reasonable to clear all mines, to release all areas that are not mined, and to investigate further those areas that are doubtful in order to determine which areas have evidence of mines and which areas do not, and

to clear or release them accordingly. The land-release approach is a significant change to both the strategic and operational roles of mine action. It centers on the collection and use of improved information to more effectively apply demining assets and return more land to safe use at a quicker rate.

The mine-action database, often based on a national Landmine Impact Survey, contains the best information available at the time it was collected. The LIS is, however, based primarily on local suspicion about potential hazards on land not in use. It indicates the extent of the problem, the area affected, the number of victims, the number of communities and people affected by landmines, and the socioeconomic activities blocked. How can it be that well-documented SHAs turn out to contain no mines or ERW, and the vast majority of area cleared has no mines at all?

The strength of the LIS is the focus on the impact of landmines on communities, but it tends to provide large and imprecise estimates of SHAs. These surveys were always conducted with the expectation of technical follow-up for operational planning. On the other hand, there is substantial evidence that the local population does not use some parcels because they suspect that mines may be present, even though the site proves to contain no hazards. In the absence of complete information, surveyors frequently respond to community concerns and uncertainty by

identifying SHAs where the community fears them to be, even though more complete information might indicate there was no hazard. At the same time, there is substantial empirical evidence that local populations make use of land previously recorded as hazardous. In some cases this may be in spite of the hazards, while in other cases it may reflect local knowledge

It is likely that there are similar misjudgments in other countries that have recorded communities as mine-affected based on community suspicion.

that the specific parcel does not contain hazards. The Information Management System for Mine Action created certain distortions in the data; for example, repeat identification of the same SHA due to its influence on more than one community may appear as “pancakes” on IMSMA-produced maps.

When the LIS is conducted by teams trained and equipped to produce more precise SHAs, the results are dramatically better. For example, during the Angola LIS, one of the six implementing partners included precise polygon figures as a task of the survey teams. As a result, the average size of SHAs produced in their area of operation was only one-ninth the average size for all other implementing partners combined. Adding this task to the survey teams required slightly more time in each mine-affected community but did not measurably increase the calendar time required for the survey fieldwork as a whole.

Better Information

It is important to periodically resurvey and continually update the national database with improved local information. Information improves with follow-up surveys for one or more reasons, including the following: more sources will be available to provide more complete information and more accurate descriptions; local populations will have learned more about their situation; local populations will have been using parts of the SHA and in the process, encountered or not encountered evidence of mines; local populations and/or clearance operators may have conducted clearance in the area; and General Survey teams may be trained and equipped to more precisely estimate the boundaries of the SHA.

For example:

- In Bosnia and Herzegovina, the original estimate of contaminated area made in 1996 of 4,200 square kilometers (1,622 square miles) has been repeatedly revised downward to reflect improved

information and clearance. The beginning 2008 estimate was 1,755 square kilometers (678 square miles), with only about 100 square kilometers (39 square miles) expected to require full clearance.

- In Cambodia, MAG and The HALO Trust identified nearly 800 square kilometers (309 square miles) of LIS-suspect land reclaimed for use by villagers, while the Cambodian Mine Action Centre determined that, in the high-casualty districts which it resurveyed, 76 percent of the LIS SHAs were no longer suspect, although another 46 percent not originally included in the LIS should be added.
- In Azerbaijan, based on systematic review on the ground with district administrators, the Azerbaijan National Agency for Mine Action reduced the total SHA to 306 square kilometers (118 square miles) from 746 square kilometers (288 square miles) in the LIS, with the further estimate that only 29 square kilometers (11 square miles) will require full clearance.
- Ethiopia provides the most dramatic example of change: resurvey of 1,018 communities in 2008 (two-thirds of the 1,492 affected communities identified by the Ethiopian Landmine Impact Survey) confirmed 892 communities as mine-free, including 28 with mine problems eliminated by spot-clearance activities of the survey teams, and cancelled over 95 percent of the SHA.

How is this last example possible? Was Ethiopia's LIS severely flawed? Is it simply that the local popula-

If there is a reason to believe that the area and number of mines are small, the Technical Survey operator will often clear the hazardous area within the framework of the Technical Survey.

tion understood how to play the aid community and provided answers that were most likely to obtain more resources? The Ethiopian Mine Action Office staff involved in the resurvey process found that in nearly all cases, the community had a clear and reasonable basis for their suspicion. Common reasons for suspicion included past or current location of military positions or trenches and knowledge of past mine incidents. However, in the vast majority of cases, the survey team determined the suspicion did not reflect the current presence of mines/ERW. While there is no indication that this degree of misapprehension is widespread, it is likely that there are similar misjudgments in other countries that have recorded communities as mine-af-



This Jangamo, Mozambique SHA was not cultivated for many years until it was released through Non-technical Survey. PHOTO COURTESY OF THE AUTHOR

ected based on community suspicion.

Quality information about landmine hazards is essential for quality mine action. First, overall information provides an overview of the national problem and is the basis for determining broad priorities, national strategy, multi-year plans and resource requirements. Second, improved information enables a national program to refine an imprecise SHA and thus more accurately delimit a demining task area. In so doing, it may release large amounts of land listed as suspect in the national database but sometimes used by the local population. This data also supports local planning efforts for land use, economic development and investment, as well as for mine-action priority-setting among SHAs. Third, further information gained within the task area may enable the clearance operator

to reduce it to a smaller area for full clearance. This supports task planning and improved focus of demining assets on specific square meters of land containing mines. The mean number of mines found per hectare of cleared land in the countries reviewed more than doubled since the introduction of Technical Survey.² As a rule, the General Survey cancels significant areas from the database, making it available for investment planning, and prepares specific requirements for Technical Survey. Both Technical Survey and clearance release land to end users and remove it from the database.

Technical Survey for Land Release

While the specific General Survey criteria applied in each country are based on national experience, individual countries tend to incorporate many of the same criteria: local use of the land in a way that would have encountered mines if they were present; indications of past military activity in the area—including military installations and evidence of the presence of mines—and community conviction that the area is free of or affected by mines.

High-quality standards, standard operating procedures and professional judgment must be exercised to determine whether the information collected is sufficient to warrant the release of a given area. Examples of criteria considered by different programs include:

- Locals have used the land in question for farming, cattle grazing or other agricultural activities for a specified period (e.g., three seasons) without evidence of mines

Experienced staff in each of the programs affirmed that their programs could advance more rapidly without sacrificing safety if they were allowed to adjust the interpretation of standards based on acquired experience.

- Land in question has been plowed completely to a specific depth at least three times
- There have been no mine/ERW incidents reported for at least a specified period of time
- No emplanting of mines was reported or observed
- There are no military installations nearby
- There were no military confrontations in this area
- No evidence of mines or ERW has been found
- Survey team checked high-suspicion spots and found no evidence of mines
- Locals are confident that the area contains no threat

Several countries have concluded that it is beneficial to include qualified demining/explosive-ordnance-disposal staff on the General Survey teams in order to verify information and to resolve small tasks. The Bosnia-Herzegovina Mine Action Center uses deminers on General Survey teams to check the spots where incidents have been reported. The Ethiopian Mine Action Office found that experienced deminers were an essential component to enabling General Survey teams to disconfirm many entire SHAs, and to resolve about one-sixth of valid SHAs caused by small-area contamination.

The purpose of Technical Survey for land release is to provide confidence that a specific area contains or does not contain mines. It starts from the assumption based on experience that a specific SHA probably contains no mines and that the way to negate that hypothesis is to adequately test the land to find evidence of mines. Assets are applied according to nationally accepted standards and standard operating procedures for “all reasonable efforts” to identify areas with evidence of mines.³ These SOPs are “lighter” than for clearance, and typically include mechanical preparation of the full site, or lanes provided by machines or mine-detecting-dog teams, with extensive visual in-

spection or checking by a single dog. If the suspicion is confirmed, the area is subjected to full clearance, building on relevant actions already taken during the Technical Survey. In practice, if there is a reason to believe that the area and number of mines are small, the Technical Survey operator will often clear the hazardous area within the framework of the Technical Survey. If no evidence is found, the specific subsection may be released as an area without evidence of risk. To the extent that this is practical, the amount of clearance and cost will be lower than with full clearance of the entire task site. In Azerbaijan, the Azerbaijan National Agency for Mine Action has found that the cost per square meter of releasing land through Technical Survey is about one-third the cost of traditional clearance.

Standards for Land Clearance and Release

In Ethiopia, areas within the polygon produced by Non-technical Survey are identified as *risk* and *low-risk* areas. Risk areas are understood to be minefields that require clearance. Low-risk areas are ones without sufficient information to classify as risk areas or to rule out such areas. Sampling and other verification methods are applied to low-risk areas to determine whether they contain mines or can be released. Since the purpose is to find any evidence of mines, the most likely locations are all checked (e.g., paths, water sources, clumps of trees), while other areas may be sampled. In principle, 100 percent of the designated area will be treated in this way and released as an “area without evidence of risk” unless specific evidence of mines is found. When evidence is found, nationally accepted SOPs are applied to determine the extent of area to be cleared, often only a small portion of the initial task area.

Developing national standards and SOPs for Technical Survey involves the application of professional judgment gained through years of experience in the national program. Experienced staff in each of the programs affirmed that their programs could advance more rapidly without sacrificing safety if they were allowed to adjust the interpretation of standards based on acquired experience. Some of the options included: partial ground preparation with increased use of visual search, single-dog searches, coverage of sites by flails or brush cutters, faster detector sweeps and less sweep overlap.

Some programs adjust the extent of “light” methodologies according to the degree of confidence in the suspicion that an area contains mines. NPA–Angola established a six-step scale extending from “certain there are mines” to “certain there are no mines,” with intermediate steps reflecting weak and strong suspicion (but not certainty) that there are or are not mines in a given area. If there is certainty of mines, the land is

cleared; conversely, if there is certainty of no mines, the land is released. If there is strong suspicion that there are mines, a higher percentage of the area will be sampled and verified in order to find any evidence of mines; conversely, if there is strong suspicion that there are no mines, a lower percentage of the area will be searched or verified to find any evidence of mines. Finding (or failing to find) evidence of mines would result in certainty that there are (or are not) mines, and the corresponding action (clearance or release) would occur. The specific level of sampling and verification may be guided by international experience, but should be determined based on national experience. NPA–Angola distinguishes specific percentages of coverage for different demining assets when used for land-release Technical Survey, according to program experience regarding the reliability of each asset in finding evidence of mines.

Improved Mine-action and National Standards

In addition to the value of a land-release approach to General and Technical Survey, recent country experience highlights several related measures to improve the support of mine action for development:

- With increased release of land without full clearance through Non-technical and Technical Survey methods, there is a need for appropriate documentation (not a clearance certificate) that declares the land to be an “area without evidence of risk.” This documentation may be a legal requirement for many development organizations. It is not a statement that the area is mine-free, because it has not been cleared; it is a statement that a reasonable effort was made to find mines and no evidence of mines exists. Land release does not simply lower the priority of an area to leave it for later treatment. Land that has been determined to be an area without evidence of risk can be used with confidence and should not be subject to further clearance efforts unless the situation changes.
- The objective of mine-action programs should be to ensure that all land achieves an “end state” as an area without evidence of risk, based on the application of “all reasonable efforts” to all SHAs throughout the country. Even so, isolated mines/ERW and possibly entire previously unknown minefields may appear over time, and there will be a need for an institutional capacity to respond to such cases. This response could be through a contracted specialist entity, through civil protection or the military, or it could be a residual capacity of the current national operators.
- An essential component of that residual capacity

is the continuing existence of the national mine-action database with the record of all past SHAs, all clearance and other land-release actions. When future changes in land use are proposed that could increase risk (e.g., excavation for urban construction), if appropriate, information can be checked and the site verified and cleared, much like if there were geological, environmental or other land-use issues. This applies whether the land has been cleared or released based on new information.

Although situations may have changed significantly since the LIS was conducted, the LIS report is in most cases the internationally accepted baseline regarding the landmine problem of each country, and it should be updated regularly to reflect both operational progress and improved information. In addition to traditional indicators of efficiency of clearance teams, programs should report on the effectiveness of land release, together with indicators of overall program effectiveness in reducing the landmine problem. Such indicators might include:

- Number of LIS-identified high-, medium- and low-impacted communities free of SHAs
- Total area or percentage of released land in use
- Amount and percent of suspect area released (seek high⁴)
- Number of mines found per hectare of task polygon (seek high)
- Number of mine-clearance tasks without mines (seek low⁵)

Community/end-user information is essential to determine when the mine-clearance effort is finished. The work of the mine-action program is not complete if end-users are not using land that has been released because they are not confident that it is safe. An excellent example of how to ensure that land has been effectively released from mines and suspicion is provided by the 2004–07 HALO Trust–Mozambique mine-impact-free districts project. Convinced that clearance of all mined areas in the four northern provinces of Mozambique was nearly concluded, HALO undertook a systematic resurvey of all communities in those provinces to determine whether there were any remaining mined areas affecting the communities, to clear any that might be identified and to obtain written acceptance from the community and local authorities that their areas were now mine-impact-free. In the process, HALO identified 74 previously unknown SHAs and cleared an additional 176 mines, which represents an additional 16 percent of SHAs (two-thirds of which proved to contain no mines) and a 0.2-percent increase in total mines cleared in

the four provinces. Communities previously not comfortable using the land were prepared to use it once their suspicions had been removed by these actions. This situation is a good example of the need to remove community suspicion of mines as part of the professional completion of mine action. Most programs have paid only very limited attention to this issue. However, as programs near completion at the national and local level, it is important to document this progress with the community, donors and other stakeholders.

In order to take full advantage of Technical Survey and land-release approaches, there is a need for a national strategy on the subject, national standards and SOPs to implement it and supportive IMAS.⁶ Similarly, the type of quality assurance appropriate to Technical Survey needs to be determined—ground sampling is still appropriate for clearance, but not as relevant to survey as information-gathering. National standards and quality-assurance procedures should be adapted to permit careful development, testing and wider use of land-release procedures to increase the effectiveness of mine action. The

Survey Action Center is currently working with the National Demining Institute to make the land release in Mozambique operational.

Conclusion

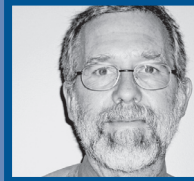
Effective implementation of the land-release approach will accelerate solutions to the landmine problem through improved information-gathering. Experience has shown that large areas and numbers of SHAs can be released from suspicion by teams combining General and Technical Survey skills, resulting in more effective use of clearance assets by ensuring they are concentrated as much as possible on areas likely to have mines. Land release is a better way to ensure that more communities and development projects benefit sooner from a solution to the landmine problem.

This article draws on research the author conducted for the GICHD ("Survey and Land Release"), and the Survey Action Center ("Mine Action Program Use of LIS Information Several Years after Survey Completion" and "Use of Minefield Information by Development Operators"). The opinions expressed are those of the author, and do not necessarily reflect those

of the GICHD, SAC or of individual programs cited (Angola, Azerbaijan, Bosnia and Herzegovina, Cambodia, Ethiopia, and Mozambique). ♦

See Endnotes, page 62

For additional references related to this article, see <http://tinyurl.com/krx5y>.



Charles Downs is a mine-action consultant. He has worked in international development for over 30 years and was Chief of the Mine Action Unit of the United Nations Office for Project Services from 1999–2004. He has been part of the Geneva International Centre for Humanitarian Demining and SAC efforts to encourage national governments to integrate land release in their survey and clearance efforts, and has assisted the United Nations Development Programme–Colombia in development of its mine-action strategy. Downs is also a Professor of International Project Management at New York University's Wagner School.

Charles Downs
Principal, Downs Consulting
Adjunct Professor
Wagner Graduate School of Public Service
New York University
Brooklyn, NY / USA
Tel: +1 646 763 2410
E-mail: charles.downs@gmail.com

Is it Time for New Terminology in Land Release and Technical Survey?

by Robert Keeley [RK Consulting Ltd.]

Overlapping terminology has contributed to confusion in the demining process and stunted the development of Technical Survey as a potentially effective concept. This article points out places where ambiguity exists and suggests ways that the terminology can be clarified.



In these two pictures, taken in Senegal in 2005, the concepts of "probably clear" and "probably mined" are clearly demonstrated. The boundary of the "probably mined" area is shown by the unattended vegetation next to the school building, highlighted by the arrow. In the picture on the right, the school playground is seen to be in regular use by the population. The problem comes in differing perceptions of "risk." What will happen when the little girl's ball (circled) someday disappears into the bush behind her?

ALL GRAPHICS (EXCEPT MINESWEEPER) COURTESY OF ROBERT KEELEY

News Brief

Geneva Call Holds Second Meeting

Geneva Call, a nongovernmental organization dedicated to working with armed non-state actors to facilitate compliance to international law regarding civilian rights, held its second meeting for the *Deed of Commitment for Adherence to a Total Ban on Anti-Personnel Mines and for Cooperation in Mine Action*. More than 40 representatives from 28 signatory groups, representing 25 countries, attended the meeting in Geneva on 18 and 19 June 2009. The meeting was held to discuss the challenges NSAs face in implementing humanitarian norms, in particular the banning of landmines. The meeting was the first of its kind to allow participants to express their own views on how they could implement a wide array of humanitarian issues, with particular interest paid to the protection of women and children in conflict-ridden areas.

In 2009, Geneva Call has successfully convinced non-state actors—internationally non-recognized and partially state-recognized groups—to sign the *Deed of Commitment*. According to Geneva Call, four separate groups have signed the document since March 2009, and since the inception of the document in 2001, 39 non-state actors have banned the use of anti-personnel mines. Most of the NSAs operate in conflict-torn regions in Africa and the Middle East.

Put three deminers in a room together and you are likely to get five definitions of the term *Technical Survey*. Disagreement about the exact definition of *Technical Survey* exists because the term has not been clearly defined. This ambiguity is problematic for two reasons:

1. Technical Survey and land release can improve the productivity of demining. If deminers choose a different method because of the ambiguity in Technical Survey terminology, they may resort to manual demining. Manual demining is slow, expensive, and in areas where the contaminated land is of marginal value, it can mean that the cost of remediation outweighs the economic benefits of clearing the land. As

a result, there is considerable incentive to improve the productivity of demining.

2. Where one finds ambiguity in a concept's definition, there is, theoretically, the possibility of turning to the International Mine Action Standards for guidance. Unfortunately, while the current edition of the relevant standards (IMAS 08.20¹) provides excellent advice on the color and spacing of marker posts once a survey is completed, it provides little advice as to how a Technical Survey might actually be conducted. This manifest weakness damages the effectiveness of what is otherwise a very helpful set of guidelines.

Work is being undertaken by the Geneva International Centre for Humanitarian Demining and others to revise IMAS 08.20. Hopefully, this revision process will help clarify some of the confusion over definitions. In addition, this article aims to clarify these concepts and will do so in three ways. First, it will set out a taxonomy of current concepts in mine action to highlight where we are misapplying terminology. Second, it will critique one of the Technical Survey concepts and demonstrate how this confusion is allowing poor techniques to persist. Third, it will set out ideas for a clarified set of terminology in order to help direct future discussions of these issues.

Existing Terminology

According to IMAS, “The primary aim of a Technical Survey is to collect sufficient information to enable the clearance requirement to be more accurately defined, including, inter alia, the area(s) to be cleared, the depth of clearance, local soil conditions, and the vegetation characteristics.”¹

The phrase “including the area(s) to be cleared” suggests a role for Technical Survey in what is known as *area reduction*. This differs from the role of Technical Survey laid out in the rest of the definition, which relates more to gathering information about the land to be cleared, but not about how to perform the clearance process. It may be the multiple roles for Technical Survey that lead to some of the confusion in its terminology.

I have found at least eight different Technical Survey (or closely related) concepts in mine action. These are summarized on the next page in Table 1. Readers will see that definitions 1–3 are most strongly related to the concept of area reduction. Note that this table only defines the processes and does not outline the various strengths and weaknesses of the different approaches. Some of these concepts, specifically Ser. 1, 3, 5 and 6, are simply referred to as *Technical Survey* by their practitioners—they do not have their own names. The names in column (b) have therefore been added to differentiate between them.

The term *risk reduction* (Ser. 8 in Table 1) is a good example of the problem of ambiguity. The same term has also been used

to describe a clearance project where full clearance techniques are used, but where it is recognized that the project will not be able to deal with all of the landmine/UXO contamination—exactly the converse of the definition described in Table 1. Similarly, the term *land release* is sometimes used to describe a comprehensive suite of processes rather than simply “cancellation” of land already in use.

“Join the Dots” and Related Sampling Techniques

One of the main issues with the lack of clear terminology is that it allows conflicting concepts to coexist without a critical analysis of the problem. Technical Survey aspires to do the job faster and cheaper. However, just because the idea behind efficient Technical Survey exists, it does not mean the techniques necessary to achieve these goals have materialized.

This can be demonstrated through a critique of the process called “join the dots” in Table 1. At first glance, this technique, when sketched out on a scrap of paper, appears effective. However, this technique can only work where the density of the mine contamination has a maximum, not average, distance between mines that is less than the width of the breaching lane, or the breaching party would go right through the minefield by mistake.

This can be verified by anyone with access to a computer running Microsoft® Windows software. Simply select the custom option of Minesweeper, the computer game that comes with Windows, and vary the density of the mine pattern. Then prepare a plan for playing the game as if it were a breaching exercise. See what pattern you would have identified and how it compares with what was actually in the game; the lower the density of the actual contamination, the less effective the breaching plan will be. Statisticians would approve of this rather simplistic test because Minesweeper generates random numbers better than any sketch drawn by a human on a piece of paper. An analysis of 10 iterations of Minesweeper provides the results as set out in Table 2 (next page).

While more games would improve the statistical significance of the results, the mean percentage of mines discovered in the defined areas as a result of this sampling process can be rounded up to around 68 percent, with a confidence interval of around +/- 8 percent (i.e., the process will find between 60 percent and 76 percent of mines at this density and search pattern) and a confidence of 95 percent in the overall result of these calculations.

Please take a look at the Minesweeper screenshots on page 22. In the first screenshot (top left), the custom Minesweeper is set up to the maximum size of 30 by 24 squares (720 squares). The game is also set to 10 mines, giving a ratio of mined/non-mined of 1/72. The standard breaching pattern is then established (in this case, one lane every five squares) which is, therefore, sampling 120 squares (120/720 or 1/6 or 18 percent).

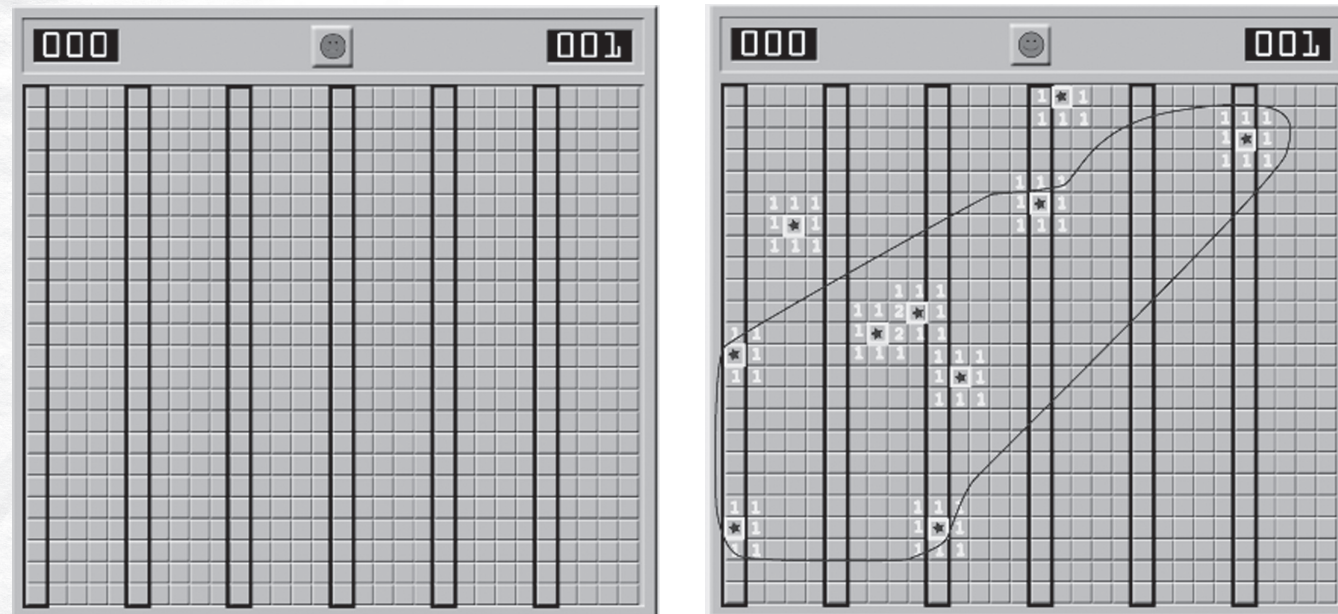
In the second screenshot (top right), the results are revealed. The breaching technique would have found five out of the 10 mines (50 percent), but use of the “join the dots” boundary marking

Ser.	Description	Explanation
(a)	(b)	(c)
1	Join the Dots	The insertion of a number of lanes at regular spaces into an SHA. Once a mine has been detected, the lane is closed. The boundary of the “definitely mined” area is then determined by joining the points together. The areas between the lanes are not searched.
2	Advance to Contact	Similar to Ser. 1 except the demining assets, particularly dogs and/or machines, advance on a broad front across the SHA so that all land is searched until contamination is found.
3	Percentage Sampling	A specified percentage of the SHA is sampled. If no landmines/UXO are found in the sampling, no further search is done. The “join the dots” process at Ser. 1 is a form of sampling.
4	Delineation	Demining teams clear a boundary around either an SHA or a project site within an SHA so that full clearance can be done within the boundaries. The process does not specifically reduce the area, although it may imply that the area outside of the demarcated boundary is not considered contaminated.
5	Investigation	Demining teams push lanes into an SHA in order to understand the nature of the contamination, required search depth and the soil and vegetation conditions. No land is released, and the process does not in itself define boundaries.
6	Land Release	This is a Non-technical Survey process by which possible SHAs are identified from preliminary General Survey processes. Land that has no specific mine indicators, and that is in general use, might be released without any further action; land that cannot be released might be subjected to Technical Survey and/or full clearance. Sometimes also referred to as land cancellation.
7	Risk Management	Although not a Technical Survey process, risk management is an analytical process intended to focus demining activity on land that is either most likely to be contaminated or is most likely to be used by beneficiaries within contaminated areas. Areas are thus reduced by disregarding land that is either not likely to be contaminated or is contaminated but has little socioeconomic impact. This concept can form part of the land-release process.
8	Risk Reduction	Although not a Technical Survey process, risk reduction is intended to maximize demining outcomes by focusing inputs on achieving a large area in which most of the mines are removed by the application of machines; the idea is that removing roughly 80 percent of the mines in a large area is more beneficial to the population as a whole than removing all of the mines in a small area.

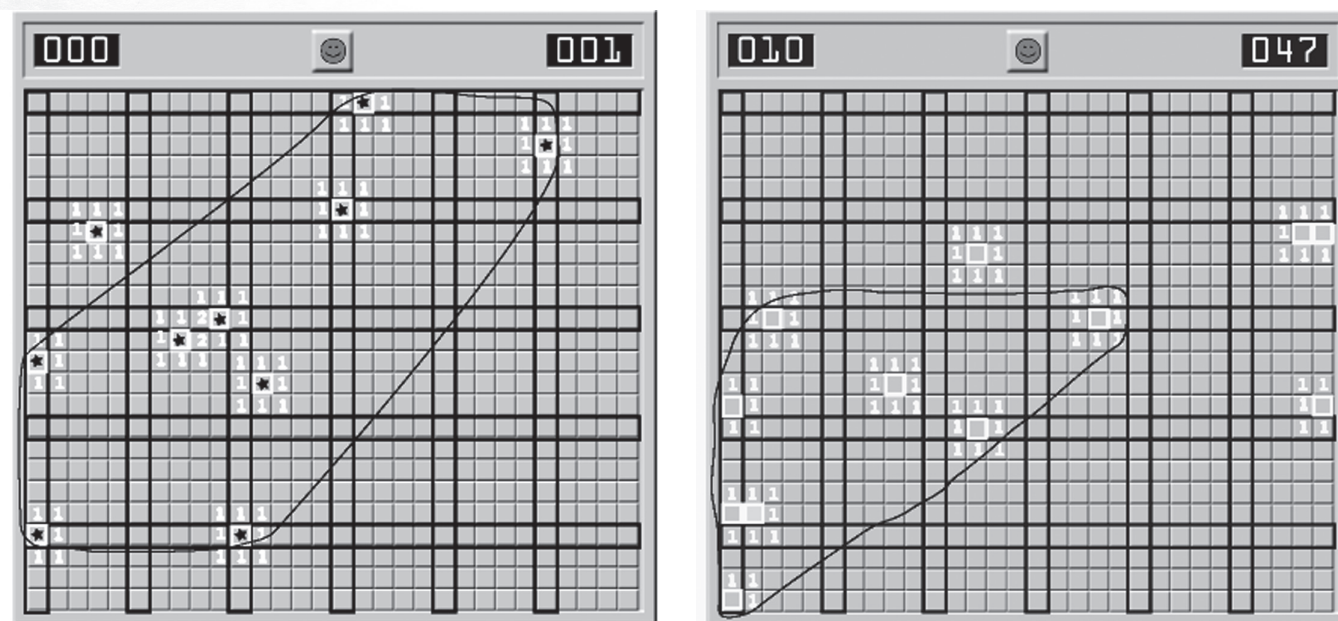
Table 1: A taxonomy of Technical Survey processes.

Item	Game										Mean	SD	CI
	1	2	3	4	5	6	7	8	9	10			
No. of mines found	5	4	3	7	4	4	5	5	4	7	4.8	1.3	.82
No. of mines included “by chance”	3	3	3	2	1	2	1	2	2	1	2.0	0.8	0.51
No. of mines remaining outside of defined area	2	3	4	1	5	4	4	3	2	2	3.0	1.2	0.77
Total (check sum)	10	10	10	10	10	10	10	10	10	10			

Table 2: Analysis of 10 Minesweeper games.



Using Minesweeper as a random generator to test breaching techniques, the stars represent where landmines were found and marked.
ALL MINESWEEPER IMAGES WERE CREATED BY MAIC UNDER MICROSOFT'S "GAME CONTENT USAGE RULES" USING ASSETS FROM MINESWEEPER®, MICROSOFT CORPORATION



Using Minesweeper as a random generator to test breaching techniques, the stars represent where landmines were found and marked.
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process would have found 80 percent of the mines. However, this still leaves two mines unaccounted for.

In the third screenshot (bottom left), the agency has improved the quality of its breaching technique by adding some lateral breaching lanes, sampling 270 squares out of 720 or 37.5 percent (which also more than doubles the cost of the breaching). In this case, an additional one of the “missing” mines would have been found, but the results were still only 90-percent effective. The mathematical relationship between density of minefield contamination, percentage sampled and percentage effectiveness can start to be seen.

One can imagine that eventually a sampling pattern is set so dense (in order to cover every mine), that it is actually cheaper to set out a simple clearance task.

In the final screenshot (bottom right), the game is replayed, allowing Minesweeper to generate another random pattern of the same density. In this case, our standard breaching grid not only identifies 50 percent of the mines, but also makes a significant error in estimating the boundary of the definitely-mined area. Thanks to Minesweeper, this thought experiment is easy to replicate independently.

It is unlikely that a potential customer of this process

or beneficiary of this mined land will be content with these percentages. Remember, recognizing that risk is a function of activity means that a single missed mine is very significant when turning this land (which previously was not used due to a fear of mines) over to a population and encouraging them to use it. Their risk is increased because they have a greater chance of encountering a mine than if they continue to remain outside the perimeter, where they are at zero risk. Given that, in this model, where 37.5 percent of the area would have been searched, the cost is probably not cheaper than a full clearance project, which would have been simpler to administer and manage.

The model is based on a very high density of sampling—one lane in five—so it is conservative compared to “typical” suggested breaching patterns of one lane every 25 meters (82 feet), and it is evidently questionable even in areas of comparatively high mine density. Lower densities of contamination would provide even less impressive results. In short, sampling for mines is only likely to work where it can be strongly predicted that the mines are laid in patterns. Circumstances of “uncertainty” (e.g., random-patterned minefields and submunition-strike footprints) do not seem to lend themselves to sampling.

As an aside, I’d like to note that we often use the terms *risky* and *uncertain* interchangeably, but statisticians have recognized a conceptual difference for some time. For example, when asked to predict the “risk” of drawing the Queen of Spades from a new, “fair” pack of cards, it can be easily calculated as 1:52. This is because even though we don’t know where in the pack of cards

the Queen of Spades is, we do know that there is only one of them and there are 51 other cards in the pack. Now imagine a situation in which the dealer is seen to take an unknown number of cards from the pack and place them in her pocket, before asking you again to draw the Queen of Spades. We now do not know how many cards are still in the pack and even if the Queen of Spades is present at all. Thus, we are not able to use statistical methods of predicting the risk as we don’t have enough information about the circumstances, and are in a condition of “uncertainty.” In the context of demining, whereby minefields are laid in regular patterns, one can imagine being able to use a statistical method to calculate the risk of encountering a mine with a particular sampling method, but where there are unknown numbers of mines in irregular patterns, conditions of uncertainty exist.

A critical reader might ask about the relatively small number of casualties in land that has been sampled under these unclear concepts. Personally, I know of at least three accidents that have occurred after this type of land sampling. While even one accident is too many, there are several explanations as to why there are few reported casualties. The main reason is that most of the land is not mined. In such circumstances, even a poorly executed procedure can appear effective because there is no potential for casualties anyway.

New Set of Concepts and Terminology

So far, examples of overlapping terminology that exist in the domain of mine action have been reviewed.

Category	Definition	Remarks
Definitely Clear	Land that has been cleared to IMAS or relevant national standards and has an available clearance certificate. The boundaries of the cleared area are clearly defined and identifiable.	
Probably Clear	Land that is in general use by the local population, and does not contain casualty reports or other indicators of contamination. May also include cleared land that does not meet the full criteria of “Definitely Clear.”	
Probably Mined	Land that is not in general use, or does not otherwise meet the definition of “Probably Clear,” but with only indirect indicators of actual contamination.	May include contamination but the boundaries of the actual contaminated area cannot be defined.
Definitely Mined	Land that can be identified as mined by the presence of one or more direct indicators and where the boundaries are clearly defined.	

Table 3: Land-contamination definitions.

Where definitions are not mutually exclusive, problems of ambiguity can be found and, therefore, need to be redefined. However, we should first review a few of the core concepts. One problem, presented by the discussion above, is a different acceptable end state from various survey processes than is expected from full clearance. While this may not be acceptable from a customer's or beneficiary's perspective, there can be no clear debate while the terminology is so disordered.

When discussing concepts and terminology, the principles in Table 3 (previous page) are suggested as a possible set of concepts. The list is ordinal where the least contaminated land is located at the top and the most contaminated land is located at the bottom.² This table is more logical than presently used terms, such as *Suspected Hazard Area*, *Confirmed Hazard Area* and *Defined Hazard Area*. It is also useful because it helps establish an end state for a survey or area-reduction process. For example, the use of these concepts would enable us to define the requirement of an area-reduction process much more clearly by

identifying *probably mined* areas as either *definitely mined* or *definitely clear*. Area clearance), however, would be a process that turns *definitely mined* into *definitely clear* areas. In the same concept, one could describe a land-cancellation process as one that identifies which parts of a suspect area are *probably clear* and, therefore, can be disregarded for further action.

One can then establish a hierarchy of mutually exclusive terms that covers the full spectrum of the concepts, which might help remove ambiguities. This proposed hierarchy of terms, with tentative definitions, is set out in Table 4 (below).

These concepts are ranked sequentially—in increasing order of time required to accomplish these tasks, but also in increasing order of expense and effectiveness. In terms of dollars per square meter, area clearance is far more expensive than a land-cancellation process, but it may be able to release much more land per intervention. It also allows the term *Technical Survey* to be saved for use in only one part of this series of

processes. Indeed, it is now possible to consider the revised concept of *Technical Survey* as being an optional process only to be used when necessary. Note also that sampling is not recognized as being a generally applicable technique in this hierarchy of concepts.

Conclusions

The term *Technical Survey* has been an ambiguous concept in the mine-action community. Redefining the term can help streamline the land-release process and avoid further confusion. To improve the *Technical Survey* definition, it must be separated from other concepts and be used to simply refer to the investigation of suspect areas for information-gathering purposes. This also allows room for the use of a se-

ries of new terms (or perhaps old terms used in a different way) that are mutually exclusive and fit into a simple hierarchy of land-release concepts. Technical Survey becomes a term to describe just one of these concepts as opposed to being an umbrella term for multiple concepts. The discussion on this topic is far from finished. Hopefully this article has helped clarify a few concepts for others to continue this conversation.

This article was written prior to the release of the new draft International Mine Action Standards related to Technical Survey and Land Release. Readers can view the new draft IMAS at <http://tinyurl.com/newIMAS>.

See Endnotes, page 62



Robert Keeley, Director of RK Consulting Ltd., is a former British Army Bomb Disposal Officer who has been working in humanitarian mine action since 1991. He was head of the United Nations Mine Action Centre in Croatia until 1997 and has also worked for Handicap International, Mitsubishi Research International (on behalf of the Japanese Ministry for Economics, Trade and Industry), European Landmine Solutions and as a consultant. Keeley has a doctorate in applied environmental economics from Imperial College London.

Dr. Robert Keeley
RK Consulting Ltd
Tel: +44 1233 888012
Fax: +44 870 199 2064
E-mail: research@rk-consulting.net
Web site: www.rk-consulting.net

Land Release	A combination of processes, including land cancellation, area reduction and clearance, by which land identified as being suspect by a Landmine Impact Survey or other initial assessments is returned for use to the community.
Land Cancellation	A process by which land that has no specific mine indicators and that is already in general use by the local community might be "released" without any further action; land that cannot be released might be subjected to area reduction and/or full clearance. The land released by such a process has not been treated by a formal mine-clearance process and is not defined as "clear"; the process is merely a recognition of an existing situation and is a means of directing effort toward areas that have a more identifiable impact on local communities.
Area Reduction	The systematic treatment of all of a potentially contaminated area to determine the actual boundaries of contamination. The technique used must be robust enough to allow the release of the land outside of the identified boundary as being clear to acceptable norms, such as those identified in IMAS or applicable national standards.
Technical Survey	The aim of a Technical Survey is to collect additional information, not always available in a General or Impact Survey, to enable the clearance requirement to be more accurately planned. This may include, for example, information on the type of contamination, the depth of clearance, local soil conditions, and the vegetation characteristics.
Area Clearance	The systematic search of an entire defined area to remove all landmines and/or unexploded ordnance to a specified depth, in accordance with acceptable norms, such as those identified in IMAS or applicable national standards. Depending on the nature of the contamination (i.e., landmines or UXO), either Landmine Clearance or "Battle Area Clearance" techniques may be used.

Table 4: Proposed concept definitions.

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Lois Carter Fay, APR
Editor-in-Chief, *The Journal*
MAIC/JMU
1401 Technology Drive/Suite 120
Harrisonburg, VA USA 22807
Phone: +1 540 568 2503
E-mail: editormaic@gmail.com

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Land-release Policies and Human-security Complexities

by Kjell Björk [University of York]

This article reviews the need for transparency and community participation in the land-release process. Participation is a fundamental part of post-war reconstruction, and the author argues that combining reconstruction with transparent participation will contribute to the quality, accountability and national ownership of the land-release process.

Mine action, and especially mine clearance, has become increasingly effective and efficient since its emergence as a humanitarian discipline in the late 1980s. The most significant improvements have been due not to substantial developments in technology but to the methodology applied to operations. Mine-action implementers have learned to assess the expected outcomes of clearance, victim-assistance and mine-risk-education activities while reaching goals effectively and efficiently. The technical improvements of metal detectors and mechanical-clearance and ground-preparation equipment, as well as increased knowledge of mine-detection-dog capacity and training, must be recognized. Still, the way we deploy assets effectively and prioritize tasks has been the most significant contribution in ensuring that mine-action operations have a relevant impact on affected communities.

General and Technical Survey have been available for decades but have now become essential elements of land release for rectifying faulty identification of suspected hazardous areas.

Land release is a continuation of mine action on the same principles, but in the context of better identification of areas needing clearance and of the implementation of the Ottawa Convention. General and Technical Survey have been available for decades but have now become essential elements of land release for rectifying faulty identification of suspected hazardous areas. National authorities must oversee land-release activities; however, a paucity of strong international



Operations Coordinator, Medic Coordinator, Sector Coordinator and other members of a survey party review future mine-clearance tasks for Norwegian People's Aid's program near the northwest border of Jordan, 22 April 2009.
ALL PHOTOS COURTESY OF DAMIR ATIKOVIC NPA GTC

guidelines increases the likelihood of unsound practices and miscommunication between stakeholders.

If mine-affected countries are to develop realistic plans for implementing the Ottawa Convention, land release must be central to these plans. There is a need for a land-release concept that allows national mine-action authorities to conduct a well-informed and efficient reduction of SHAs while improving cost efficiency in operations. This article proposes an approach to land release that emphasizes a high level of community participation and transparency to ensure access to viable information about SHAs. It also examines at the land-release process congruent with communities' perception of acceptable risk and Ottawa Convention requirements.



In northwest Jordan, the survey team spends substantial time in the military-controlled border zone distinguishing potentially mined areas from safe ones. Many parts of the original SHA have been used by local farmers for years for agricultural purposes.

Transparency and Participation in Land Release

Responsible land release is an issue of effective information-gathering and risk management. These concepts are dependent on transparency and participation by all relevant stakeholders.^{1,2} A transparent process fulfills two requirements for successful land release as defined in the Geneva International Centre for Humanitarian Demining publication *A Guide to Land Release*:

1. The possibility of a high degree of community participation
2. The liability for decisions made in the land-release process³

The possibility for communities and authorities not involved in mine action to participate in the process is essential both in terms of ensuring relevant information is gathered and analyses on threats posed by SHAs are well-informed. Transparent processes—those in which subjective decision making is minimized, and actions and conclusions are documented and related to a legislative process—fulfill three main purposes:

1. A quality-control system to prevent mistakes rather than later having to rectify them
2. Accountability and liability for actions undertaken in the land-release process

3. Acceptance of the land-release process among affected communities

First of all, requiring a documented process in which all stakeholders contribute to a system that prevents nonconformities rather than correcting past mistakes ensures all steps to gathering and analyzing information are followed. In other words, the documentation of the process should be designed to ensure that all steps in information gathering and analysis are completed and of adequate quality to prevent land from being released on faulty assumptions. Preventing nonconformities from reaching and affecting the end user is an essential part of a quality-control system (such as *ISO 9000*⁴) and can, in the case of land release, have mortal implications.¹

Second, transparency fulfills two essential purposes in terms of liability. As an employee of Norwegian People's Aid once said, "In this business, it is not a question of *if* an accident will happen; it is a question of *when*." Mine action has come a long way since the 1980s in terms of quality and safety. Still, accidents happen, and at some stage, some released land will contain landmines. If land has been mistakenly released because of negligence or a faulty process, it is important that the process is well-documented. This way, information can be corrected or, in the worst case, people

Accidents happen, and at some stage, some released land will contain landmines.

will be held accountable for their actions. It is equally important for land-release staff to document their actions to prove their diligence in the event that mine contamination is discovered.

Third, in its conclusions, *A Guide to Land Release* defines seven broad principles for land release:

1. A formal, well-documented and recorded process of investigation into the mine/explosive remnants of war problem
2. Well-defined and objective criteria for the reclassification of land
3. A high degree of community involvement and acceptance of the decision-making process
4. A formal process regarding the handover of land prior to its release of land
5. An ongoing monitoring mechanism after the handover has taken place
6. A formal national policy addressing liability issues
7. A common set of terminology to be used when describing the process³

All of the above principles benefit from transparency both in terms of gaining confidence in the process among end users and providing accountability for its implementation. To promote national ownership, the land-release process must take terrain, land use, cultural communication and the national legislative system into consideration, as well as accuracy in the assessment of SHAs. To a large extent, creating an effective national land-release

process depends on national authorities' capacity to govern the process to meet human-security needs, as well as developmental and economic requirements for reducing SHAs.

Community participation is an undeniably essential part of basic governance.⁵ If a mine-action authority is to make land-release decisions that support the communities' perception of acceptable risk, the communities must be involved in the initial decision-making process.

Areas without Obvious Risk vs. Areas Reclaimed or Cancelled

Norwegian People's Aid's Mine Action Team in Bosnia and Herzegovina had heated debates regarding the use of terminology to be used to differentiate areas initially suspected to be mined from those selected based on survey data for an actual clearance task. These discussions took place before the concept of land release had been defined, but served as a precursor to it since, in effect, it was an early effort by the Bosnia and Herzegovina Mine Action Centre and other operators to better define which areas were actually in need of clearance. The debate then focused on the issue of whether unused areas adjacent to or in close proximity to known minefields could be deemed safe for use because there was no indication of mines in those specific locations.

In a country such as Jordan, which has organized minefields, it might be feasible to deem areas safe because of information indicating an absence of landmines. In countries such as BiH, where warfare was conducted over an extended period of time and included random and small clusters of landmines being emplaced, more extensive survey methods must be used.

In a country such as Jordan, which has organized minefields, it might be feasible to deem areas safe because of information indicating an absence of landmines.

While clearing areas that had been used for years as pasture grounds or low-intensity farming, the demining teams often found small clusters or individual mines untouched by animals and humans using the area.

On the other hand, in areas where the non-existence of landmines cannot be verified through intensive land use over an extended period of time, or where community populations inhabiting the area throughout the conflict can verify that landmines

were never used, the term *without obvious risk* clearly states the conclusion of assessors. End users can then understand and be educated on the potential of encountering unexploded ordnance and landmines, even if the plausibility of encountering UXO is minimal after the land-release process.

Providing information about potential residual risk is important when determining verification requirements based on how land will be used. One example is road construction in Angola, where SHAs are not



An area originally considered suspect along Jordan's northern border. The need for clearance is significantly reduced by detailed records and the use of datum posts.

cleared unless the existence of mines is confirmed. A common practice is to plow the top layer of the road, check the debris for UXO and mines, after which the new foundation of the road is laid and the road constructed. The methodology provides adequate safety for road construction and future traffic. This level of verification is not adequate if the road might lead to a growth in activities at intersections or along sides of the road. An area initially intended simply for road reconstruction can develop into an area where people undertake construction, perform agricultural work and move on foot.

A Model Solution

A functional land-release process must not only include a rigorous system of accessing and analyzing available data; it must also ensure that end users have an understanding of and confidence in the process as a whole. Of the countries reviewed in the GICHD guide,³ Croatia presents the most detailed and comprehensive system for land release. In its criteria, "conversations with contact persons" is listed; however, no specific reference to the affected communities included. Cambodia and

Yemen refer to information from the communities, while Iraq and Lebanon refer to the land owner.

By using Croatia's methodology and emphasizing the inclusion of affected and nearby communities, the end user of the land and the land owner, a comprehensive system can be created. By involving affected communities in the process, civilians develop confidence and become aware of any residual dangers. If the community knows that hazards might exist after land release, this awareness will also contribute to the sustainability of the process. If the land-release process is conducted without community participation and a released area proves to contain landmines or explosive remnants of war, there is a risk that the process in other areas will be questioned. Affected communities and end users should not only sign off on a document of approval created by the mine-action authorities, but also let the surveying authority or organization act as a facilitator, assisting the communities with the assessment of risks in SHAs by providing accessible information and supportive analysis, ultimately enabling the community to conclude which areas can be released for use without clearance.

Conclusions

An effective land-release process should be based on the end users' perception of acceptable risk, guided by clear national regulations and supported by the national mine-action authority. Where end users can be identified, they should act as key stakeholders throughout the process. In *A Guide to Land Release*, the GICHD identifies the core components of a successful land-release process; however, to effectively assist mine-action authorities in developing national legislation and protocols, a greater emphasis must be placed on the need for engaging

end users and affected communities. To allow meaningful participation in the process, there are a number of points that should be further developed as part of the guidance and advice to authorities:

1. The intended end users, which are not necessarily the land owner or local authority, should be included as partners of the surveying authority or organization whenever possible. Doing so allows them to identify their perception of acceptable levels of risk at an early stage and to know what potential threat remains in the area.
2. All information the surveying authority gathers should be reviewed with the end user. This involvement will encourage the identification of additional sources of information, as well as create an understanding of the process.
3. When the intended end use of released land considered to determine acceptable verification levels, an assessment must be conducted regarding additional end users' potential follow-on activities. Land release and subsequent investments in development are catalysts for expanding social and economic activities, and the tolerable risk levels must encompass those, as well as the direct post-land-release activity.
4. When possible, the end user should be a co-creator and signatory to the land-release documentation, rather than having the role of approving a document created by the surveying authority. Legal accountability cannot be transferred to the layman, but by being a partner in the land-release process, the end user engenders transparency and develops an understanding of the process.

Participation will naturally bring additional work and require more time than a simple survey. In conflict and post-conflict situations, displacements and refugee movements will hinder end-user participation. When it is feasible, however, participation and transparency will be productive for two main reasons: first, the quality of the land-release process is dependent on information regarding SHAs, as well as perceived tolerable risk levels, to which end users can be key contributors; second, accountability and acceptance of the land-release process are essential for its sustainability. By involving the end user throughout the process as a partner, both issues are effectively addressed. ♦

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Kjell Björk has worked as Programme Manager in Bosnia and Herzegovina and Iraq, and as a consultant in Africa and the Middle East. Currently, he is completing a doctorate, titled "Governance Indicators and Key Factors for the Implementation of an International Treaty: Mine Action in Jordan," with the post-war reconstruction and development unit at the University of York.

Kjell Björk
Post-war Reconstruction and
Development Unit
Derwent College
University of York
YO10 5DD, York / United Kingdom
E-mail: Mine-Action@york.ac.uk

Gender and Land Release: The Responsibility of the Mine-action Community

by Marie Nilsson, Virginie Rozès and Juliane Garcia [Swiss Campaign to Ban Landmines]

In many countries, men are considered the sole landowners, leaving women with few property rights. Yet women are disproportionately affected when men are killed or injured by landmines, as they can be left with few resources after such tragedies.

Land is a basic source of wealth, social status, power and well-being. It is also a major source of employment in rural areas.¹ When land is affected by landmines, however, the use (and sometimes ownership) of it is modified, as key land is blocked and access to services is

To that end, the land-release process triggers many challenges from a gender perspective. Women and men have to leave or stop using the land because mine contamination makes it too dangerous on which to live and/or conduct daily activities. But what happens once the land is cleared and ready to be returned to citizens in the communities? Are women and men equally involved and consulted in the process of releasing the land? Who decides how the cleared land is going to be used and by whom? Do women and men have an equal say in these decisions? What are mine-action organizations' impact and responsibility in this process? This article will try to answer these questions by exploring the importance of integrating the perspective of gender into land-release procedures.

Women's Disadvantages and Mine Action

Land policy is a delicate issue to which there are many gendered aspects. In some countries, land legislation favors males. Under customary law, which exists in many societies, males are in most cases considered to be the owners of the land. In those situations, women may only have access or rights to use the land because of their relationship with a male relative. These cultural rules greatly impact women as they prevail over written laws, which may actually allow them to own land.¹ In cases in which the law recognizes and protects women's rights to land (such as property- and land-ownership rights, equal inheritance rights for daughters and sons, and marital property for women),¹ enforcement of these laws is difficult. In Colombia, for example, due to the armed conflict, both women and men face problems accessing their land. Women, however, are discriminated against in a disproportionate manner; although legally they are entitled to land ownership, in practice they struggle

On the way to collecting water, Bangladesh.
PHOTO COURTESY OF UNHCR/ S. KRITSANAVARIN

to exercise this right. As a consequence, when demining activities take place and land is released, women often lose access to their land as a result of gender-based discrimination. Moreover, profits made from these land areas seldom benefit women. Statistics reveal that women own less than 5 percent of the world's titled land.²

Furthermore, women do not always have access to information about their economic and legal rights, and if they do, they are often reluctant to exercise

them and powerless to effect change or to participate in any decision-making process. Due to illiteracy (proportionally higher among women as compared to men) and, in many cases, their secondary social status, women do not feel confident enough to stand up for their rights. Thus, daughters would rather concede their rights to brothers to avoid conflict, and wives and daughters may not insist on having their names included on the title to household land because of potential conflict with their husbands or families.¹

A woman and her son coming back from the market in Hudur town, the capital of the Bakol region in southern Somalia.
PHOTO COURTESY OF PASCAL BONGARD/GENEVA CALL

limited. Women, girls, boys and men living in mine-affected communities can no longer fulfill their daily activities without the risk of becoming victims of landmines. Thus, the main objective of humanitarian mine action is to clear land with the aim of releasing it to the civilian population as quickly, safely and cost-effectively as possible.

In such a context, it is problematic for mine-action organizations to carry out their work without taking into account the discriminatory environment in which land release is taking place.

Challenges for female-headed households. The challenges relating to gender and land release are even more acute for female-headed households. Since most direct victims of landmines are men, women living in mine-affected communities become heads of households or caregivers to their injured husbands—a role they have not been prepared to undertake and for which the laws on land ownership are not suited. The head-of-household role raises many questions, including what happens to women injured by landmines who become *de facto* heads of households as a result of abandonment or divorce, and what happens to those who become widows due to their husbands' deaths. Will they be deprived of their access to land as they do not have the legal right to inherit it? These issues should be a concern for mine-action actors and be taken into account in land-release procedures.

Discriminatory mine-action practice. Land release does not start when the clearing is over—it starts much earlier and is part of the initial prioritization process. The land goes through general-assessment activities which consist of collecting and analyzing information and, if necessary, performing clearance. Analyzing information, i.e., the Technical Survey, is the technical verification of the presence or absence of landmines. The process ends with the handover of the land once it has been cleared of landmines deemed releasable due to the absence of a landmine threat.

Ideally, in line with arguments that view gender equality and equity as crucial for a balanced outcome, all the different phases of land release should be based on equal participation and involvement of female and male mine-action beneficiaries. Yet in reality, women are often being left out of mine-action implementation and decision-making processes. Stereotypically, the mine-action process often operates in a way that is not always sensitive to female workers. A mine-action organization or a national mine-action authority (generally represented by a man) meets the community or the local representative (another man) to discuss the elaboration of land-release procedures. In this male-dominated, homosocial environment, women are often unable to meaningfully express their concerns. This discrimination based on gender not only deepens inequalities within the local community, as men will make a decision without taking women's points of view into account, but may also cause severe consequences for the community. For instance, many areas exclusively used by women for the sake of the

whole community (such as routes to collect firewood or fetch water) are at risk of being left out of the prioritization process.

Gender Issues in Land Release

To ensure fair land-release procedures, mine-action authorities and other responsible land-release organizations need to adopt a gender-sensitive strategy. This approach requires a gender analysis be implemented regarding the access and use of the land by all members of society and that gender-disaggregated information is systematically collected. This process implies looking at many crucial issues such as:

- Women's legal right to own or utilize land for long periods of time
- Women's customary and socially accepted right to own or control land
- Women's ability to claim and/or enforce their legal rights, in particular, in the special cases of single, divorced or widowed women, as well as polygamous relationships
- Women's access to information¹

Gender training for staff. In order to carry out the process described above in a gender-sensitive manner, mine-action staff should be trained on the gender dimensions of mine action. Staff, both at headquarters and in the field, need to be aware that mine-action activities do not benefit males and females equally and that gender equality does not happen by itself but only if active measures are undertaken to ensure an equal and fair outreach. Gender training must therefore be mandatory and considered just as important as other technical competencies needed to fulfill the goals of mine action.

Land-release certificates. Mine-action organizations should investigate if procedures required to receive land certificates or post-clearance titles act as barriers for women to receive land. If the land was purchased by a couple, land-release authorities should register land certificates in both spouses' names to ensure legal ownership for both women and men, instead of titling the land only to male household heads, as is often done.¹ There may also be administrative barriers regarding issuing these certificates to women, as women might not have either access to the valid information or the knowledge (e.g., literacy) or the power to claim the land.

Advocating for a change. Mine-action authorities, responsible land-release organizations and donors should formulate specific gender-related conditions for the implementation of the land-release process and/or the disbursement of funds. The first step would be that mine-action organizations explicitly commit themselves to gender equality as a fundamental principle for all their

work. This commitment could also imply integrating the land, housing and property rights of women into the land-release agreement, making sure that governments are provided with technical assistance to abolish laws or practices that discriminate against women on issues concerning inheritance and ownership³ and raising awareness in the community on the topic.

An equal and meaningful consultation process. Mine-action organizations should evaluate the needs of all the members of a community. Furthermore, the economic and social impact of the land-release process for these groups at an early stage by consulting both women and men, ensuring not only quantitative but also qualitative participation. If all voices are not heard at the outset, it will be very difficult to hear them once the handover of the cleared land is taking place. Some questions that need to be addressed include: Whose needs are taken into account? How will the land be used and by whom? Will the activity for which the land will be used reach women and men equally?

It is also necessary to ensure that women and men in mine-affected communities receive information that land has been cleared and is ready to be used. Women and men might not have the same access to information, so the channels for conveying this message should be broad and include a variety of methods. For example, informational material must be distributed through as many means as possible, including services exclusively used by women, for example, through midwives or women's groups. As women often suffer illiteracy to a greater extent than men, communication methods should include verbal/auditory, visual and other non-written forms.

Before the actual release of land takes place, a formal handover process should occur. This procedure involves thorough documentation signed by the future users of the land, the local community authorities, representatives from the organization that carried out the assessment and the national authorities.⁴ It involves meetings with local authorities and representatives from the populations who will use the released land.⁵ However, just meeting the community leaders or local authorities does not necessarily mean that all views will be reflected. Authorities must actively seek this information.

Linking mine action to development. Demining organizations often operate under a single mandate: to clear a specific, marked area of landmines and other explosive remnants of war. What happens at the end of this process is often not controlled or within the organization's mandate. Mine action, however, does not occur in a vacuum. Mine clearance, regardless of who is undertaking the activity—national teams, commercial



Albanian women cultivate food after returning to Kosovo.
PHOTO COURTESY OF UNHCR/ R. CHALASANI

companies or local and international nongovernmental organizations—is often part of a larger plan in which goals and expectations go further than just the removal of landmines. If clearance is put into its broader development context, land release goes from focusing on land to people—the women, girls, boys and men in the mine-affected communities. Thus, in a larger perspective, mine action must be integrated, taking into account the aftermath of the handover of the land and human consequences of that handover. It also must link with development schemes such as livelihood projects, community-development activities and ideas of reconstructing rural infrastructure. It is therefore necessary to involve local populations of women and men in the reconstruction process to ensure equal rights and protection as they return to the released land. Mine-action organizations, while implementing the land-release process, should link up with development organizations to ensure fair and equal post-handover rights.

Possibilities for Change

Mine action is currently in a transition process in which the focus is shifting from the number of square meters cleared to the beneficiaries, i.e., all affected stakeholders in mined communities. However, despite positive recognition that gender equality is a precondition for successful mine action, many actors are still reluctant to redefine the sphere from purely technical to one that takes a greater responsibility for sustainable development. In this regard, mine-action organizations need to be aware that women may have different needs, preferences and priorities for land use compared to men. Since women and men usually perform different activities, the



Marie Nilsson is a Gender Programme Manager for the Swiss Campaign to Ban Landmines. Before joining the Swiss Campaign she worked as Gender Advisor at the Swedish Rescue Services Agency and was responsible for the gender sensitization of humanitarian activities with tasks ranging from field analyses through the development of gender toolkits and training events to organizing seminars and contributing to gender-aware recruitment systems.

Marie Nilsson
Programme Manager
Swiss Campaign to Ban Landmines
3 bis Chemin des Pontets
1212 Grand-Lancy
Geneva / Switzerland
Tel: +41 22 879 1052
Fax: +41 22 879 1051
E-mail: m.nilsson@scbl-gender.ch
Web site: www.scbl-gender.ch



Virginie Rozès worked as a Programme Officer with the Swiss Campaign to Ban Landmines Gender and Mine Action Programme from March 2008 through July 2009. Previously, Rozès worked as a Women and War Research Assistant at International Committee of the Red Cross where she undertook research on sexual violence in armed conflict. Earlier positions also include researching sexual and gender-based violence for United Nations High Commissioner for Refugees and gender history for the Academic Research Center on Gender Studies in Lyon, France.

Virginie Rozès
Former Programme Officer
Swiss Campaign to Ban Landmines
E-mail: Virginie.rozes@free.fr or
a.massleberg@scbl-gender.ch



Juliane Garcia joined the Gender and Mine Action Programme as Programme Assistant in January 2009 for a five-month period. She has a master's degree in public international law and is currently studying at the Academy of International Humanitarian Law and Human Rights in Geneva. She is writing a thesis on the disarmament of weapons of mass destruction. Previous positions include internships at Intermón Oxfam, Spain, and at the Permanent Mission of France to the Conference on Disarmament, Switzerland.

Juliane Garcia
Programme Assistant
Gender and Mine Action Programme
Swiss Campaign to Ban Landmines
E-mail: j.garcia@scbl-gender.ch

land use may not necessarily benefit both genders equally. In patriarchal societies, men may not have the knowledge or understanding to address women's concerns, and women may not be encouraged to talk about the issues.

Frequently excluded from peace processes and mine-action activities, women are likely to suffer continued violence and discrimination in reconstruction and rehabilitation activities, as well as human-rights violations.⁶ Many displaced women returning home after a conflict face difficulties securing access to housing, land and property. In fact, they may be culturally or legally denied access to it.³

If there is no involvement or participation of both genders in a community from an early stage of the mine-action program, these programs not only carry the risk of sustaining existing inequalities, but, more dangerously, may exacerbate them. A sound mine-action

plan takes precautions to ensure that land-release processes benefit all members of society equally. ♦

See Endnotes, page 62

Making Land Release in Mozambique Operational

by Antonio Belchior [*Instituto Nacional de Desminagem*] and Charles Downs [*Downs Consulting*]

Mozambique's national program for land release has cleared many Suspected Hazardous Areas in the past eight years, but the *Instituto Nacional de Desminagem* (National Demining Institute) aims to make the program even more effective. In March 2009, IND collaborated with the Survey Action Center to host a workshop at which land release terminology and concepts were discussed, hoping that improved survey methodologies would lead to a more efficient land-release process. The workshop resulted in the creation of national land-release draft elements and criteria that will help to develop practical land-release standards in the near future.

Mozambique's *Instituto Nacional de Desminagem* is interested in the land-release approach as a practical method to increase the efficient use of demining resources and to more rapidly eliminate the threats to life and obstacles to development caused by landmines and other explosive remnants of war found in Suspected Hazardous Areas. Land release emphasizes the continuous collection of information to determine where mine clearance is necessary to eliminate community suspicion and support full use of land.

In Mozambique, land release builds on existing good practices of the national program. The 2000–02 Landmine Impact Survey estimated there were 558 square kilometers (215 square miles) of suspected areas, with 1,374 SHAs affecting 791 communities. While approximately 60 square kilometers (23 square miles) have been cleared over the past eight years, the current best estimate is that 12 square kilometers (5 square miles) of SHAs remain. The difference is primarily the result of cancellation through continuing survey and improving information. In addition, demining operators regularly clear only a portion of a demining task area, with the remainder reduced through “lighter” methods. Nonetheless, a majority of tasks completed in 2008 detected no mines or explosive remnants of war. There is still room for improvement, and a deliberate application of the land-release approach is expected to improve the efficiency and progress of the national program as a whole.



A visit to Handicap International task site—the landowner confirmed that the Suspected Hazardous Area on the right (identified a decade earlier) was actually overgrown by choice and not because of mine threat.

ALL PHOTOS COURTESY OF IND/MOZAMBIQUE

The Workshop

Discussion regarding land release in Mozambique began in 2008 when IND management, with the support of the Geneva International Centre for Humanitarian Demining, introduced the subject within IND and with other stakeholders. As a second step, IND invited the Survey Action Center to help develop a policy approach and facilitate a workshop for its operations/quality-assurance staff. The purpose of the workshop was to develop operational procedures related to



IND-SAC workshop participants discuss principles of land release.



Workshop participants visit HI task site.

land release, particularly through Non-technical and Technical Survey, for quality assurance of the process, and for the documentation of results. These issues are particularly relevant in Mozambique, since land-release activities will most often be carried out by demining operators, with the IND providing quality assurance and acceptance of the results. Thus, IND staff would need to understand the typical operator steps to conduct land release through survey and the appropriate measures for quality assurance of that process.

The workshop effectively combined conceptual discussions, working groups and site visits. The training centered on a few key topics: quality management and quality assurance for mine action, concepts and methods for land release, land release through Non-technical and Technical Survey methods, specific criteria for land release relevant for Mozambique, and practical use of the criteria. This resulted in agreement on draft elements for two important documents: “Elements of National Standards for Land Release” and “Criteria for Release of Suspect Areas Through Survey.” Additionally, the workshop resulted in the revision of the terms of reference, procedures and forms for quality assurance of demining.

The participants evaluated the workshop in very positive terms. They believed that the combination of theory and practice provided a level of understanding and technical capacity that will enable them to participate in the field with operators and communities to objectively and responsibly evaluate and validate suspect areas proposed to be cancelled, confirmed or cleared. Participants emphasized the need for quality-assurance teams to be directly involved with the reclassification of SHAs, that this should be done in permanent dialogue with the local communities and operators on the ground, and that this will result in greater confidence in the data eventually contained in the official information-management system.

Implementation

The next steps for starting to use the land-release approach in Mozambique include:

1. Finish the current internal IND discussion regarding the draft norms and criteria
2. Expand the discussion to include humanitarian and commercial operators active in the country
3. Refine the draft norms and criteria
4. Determine how the operators will apply the norms

This will lead to a pilot application of the interim standard, criteria and procedures for land release, which will be evaluated after a period of six months.

The implementation of the methodological principles of land release through survey is expected to provide greater rigor and objectivity both in the process of reduction/cancellation of suspect mined areas and in the treatment of information regarding newly identified SHAs. The IND leadership looks forward to the improvements this may bring to the national program as well as to the communities, institutions and individuals whose lives and work are still affected by the remaining landmine problem in Mozambique. This experience should also bring useful lessons for other programs.

The IND staff in the workshop concluded that the IND should take the lead in developing national land-release standards and procedures in full discussion with operators and other stakeholders, and that the national database should be promptly updated to reflect land-release decisions.

Draft Elements and Criteria

Draft elements for national land release standards include the following:

- Each specific SHA should be identified and investigated; that is, the process is not simply completed by general actions or adjustments to consolidated totals in the database.
- Objective criteria should be established to decide whether a given area will be reclassified or kept as previously defined. The criteria should not be applied mechanically; they may be applied to entire SHAs or to portions thereof.
- Local communities must be involved in the land-release process, both as sources of information and in the acceptance of any decision regarding released land.
- The decision to cancel a SHA should be made in agreement between the IND, the operator and the community. Cancellation should not be forced on any party and should be reflected in the signature of representative parties on the corresponding documentation.
- Areas should be handed over by IND to the community promptly after conclusion of work.

Draft criteria for release of specific parcels of land through survey developed in the workshop for further discussion included:

- Any specific area that has been used regularly for at least five years without evidence of mines



Working groups debate operational criteria for land release.

- Agricultural land that has been plowed for planting by animal or mechanical means for two years without any evidence of mines
- Areas where the local population has freely moved for two years without evidence of mines
- Areas where surface vegetation has been removed by hoe for planting of cereal or other crops, where seeds are planted about 30 centimeters (12 inches) apart, for five years without evidence of mines
- Areas used intensively as pasture (e.g., cattle grazing) for two years without evidence of mines
- Forested areas cleared by powered logging equipment without evidence of mines should be cleared immediately
- Forested areas used for gathering wood for fuel, roots, etc., without evidence of mines should be investigated further
- Areas subject to other types of intensive use without evidence of mines for two or more years
- Areas sufficiently checked by Technical Survey without finding any evidence of mines
- When the local population and a technical team agree that there is no evidence of mines

The IND will finalize the standards and detailed criteria in discussion with the demining operators active in Mozambique. This will provide the framework to implement land release and increase the efficiency of mine action in Mozambique. These changes will improve the national program and may provide an interesting paradigm for other national programs and organizations. ♦



Antonio Belchior joined the *Instituto Nacional de Desminagem* (Mozambique National Demining Institute) in 2001, and is now Chief of the Operations Department. He manages the IND staff responsible for quality assurance of demining conducted by independent operators in Mozambique and for the coordination of education activities to prevent accidents with mines and other ERW. He has a university degree in education and has worked in both teaching and training. In 2005, Belchior participated in the United Nations Development Programme's Senior Managers' Course delivered by the Mine Action Information Center at James Madison University.

Antonio Belchior
Chief Operations Department
Instituto Nacional de Desminagem
Rua da Resistência 1746, Bloco B, 7 andar
Maputo / Mozambique
Tel: +258 21 410400
Fax: +258 21 418577
E-mail: amartins@tvcabo.co.mz
Web site: <http://www.ind.gov.mz>



Charles Downs has worked in mine action since 1999, when he became the Chief of the Mine Action Unit of the United Nations Office for Project Services, a position he held until 2004. Downs is a consultant who has worked with the Survey Action Centre, the Geneva International Center for Humanitarian Demining and the United Nations Development Programme on various projects. He is a Professor of International Project Management at New York University's Wagner School.

Charles Downs
Principal, Downs Consulting
Adjunct Professor
Wagner Graduate School of Public Service
New York University
Brooklyn, NY / USA
E-mail: charles.downs@gmail.com

Clearing Areas Right; Clearing the Right Areas

by Håvard Bach [GICHD]

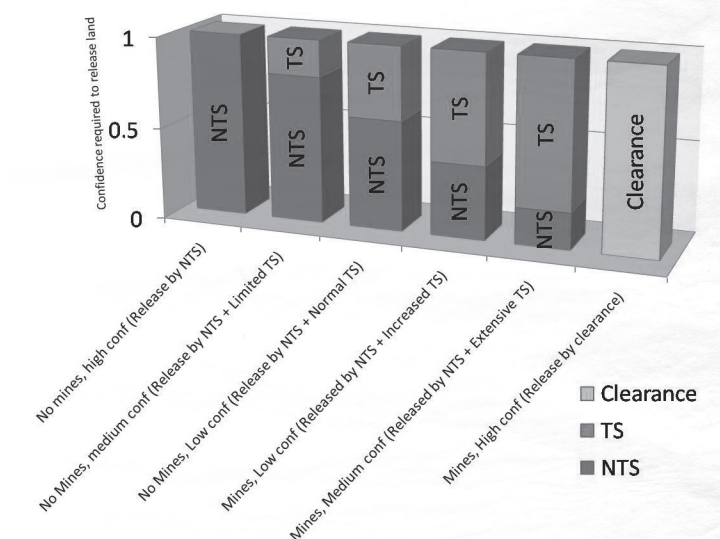
Although *land release* is a widely used term, its definition is not universally understood. There are various approaches to mine clearance with different survey steps taken before conditions of safe land release are met, and some techniques are more efficient than others. This article examines ways of improving land-release methodology to more effectively define and ultimately resolve the landmine problem.

Is land-release methodology useful? The answer to this question requires insight into what land release is as a concept and how it can be applied in the field. The term *land release* is not entirely new, and it has gradually found its way into mine action, as well as the lexicon of most governments and organizations. It is now widely used, and while a few criticize the term, most embrace it. Rather than being an indication of a problem with the term itself, this criticism is perhaps related to the differences in understanding what it implies. Misuse of the term to support specific agendas may also have added to the backlash.

In the past, the practice of releasing land was based on a subconscious and subjective decision-making process by demining organizations in the field. There is, in principle, nothing wrong with informal decision-making, but when it causes excessive clearance, and subsequently a waste of resources, there is a need to reflect on whether current practices are efficient and if they should be challenged. A comparison between cleared areas and the numbers of mines and pieces of unexploded ordnance found in 15 countries showed that less than 3 percent of the land cleared contained mines or UXO. While it is not always the case that demining organizations waste resources clearing mine-free land, it unfortunately is a problem that occurs far too often to be ignored.

The Problem

Often in the field of mine action, we know there are mines but do not know their exact locations—nor even how many there are, or the actual size of the mined area. In the absence of a more detailed framework for completing the task, it is left to operators and



The figure illustrates how land can be released by Non-technical Survey (NTS), if it provides sufficient confidence that land is mine-free.
ALL GRAPHICS COURTESY OF THE AUTHOR

contractors—guided by rigid criteria to leave no mines behind—to assess the task at hand and decide where to use scarce demining resources. The absence of a proper framework for defining and guiding mine clearance has inflated the perceived landmine problem, while allowing inefficient mine-removal practices.

Clearing mines is actually the least difficult aspect of mine action. The real challenge lies in defining the task and determining the location of the mines, but there has been reluctance to find effective solutions. Relevant factors that promote inappropriate and conservative decision-making include:

- Flawed use of success indicators
- Pressure by local authorities

- Faulty survey concepts
- Fear of making wrong decisions
- Unclear use of terminology
- A lack of an evidence-based survey approach
- Poorly understood role of clearance assets in Technical Survey
- Failure to combine Non-technical and Technical Survey results
- Poor documentation procedures

Definition of Land Release

No clear consensus on the meaning of *land release* exists, and this lack of understanding has led to numerous misguided discussions. Using basic definitions in the context of mine action, land release should be understood as an evidence-based process of defining, and subsequently removing, suspicion of landmines or other explosive remnants of war.

Cleanup of Databases

Land release is often confused with the process of cleaning up incorrect entries in databases after a previous Landmine Impact Survey. The polygons from a Landmine Impact Survey or other non-evidence-based survey are, however, incorrectly perceived as the boundaries of mined areas. Governments should not use impact-based data (such as from a LIS) to define the geographical extension of a mine problem, but should rather use data from an appropriate Non-technical Survey process. Non-evidence-based data may be a useful indicator of where further investigation is required, but it does not remove the need for a Non-technical Survey process.

Political Framework

The majority of mine-affected countries—and most international donor countries—have signed the Ottawa Convention (ban on anti-personnel landmines). The Convention has had a positive impact on all mine-action stakeholders, despite some countries' refusal to sign it. At the Ninth Meeting of States Parties in November 2008, a policy paper on land release offered these important recommendations:

- Land can be released by Non-technical means, Technical Survey and clearance.



Overall confidence in survey can be a product of confidence provided by the Non-technical and Technical Survey. It can lead to a clearance requirement or to the release of land.

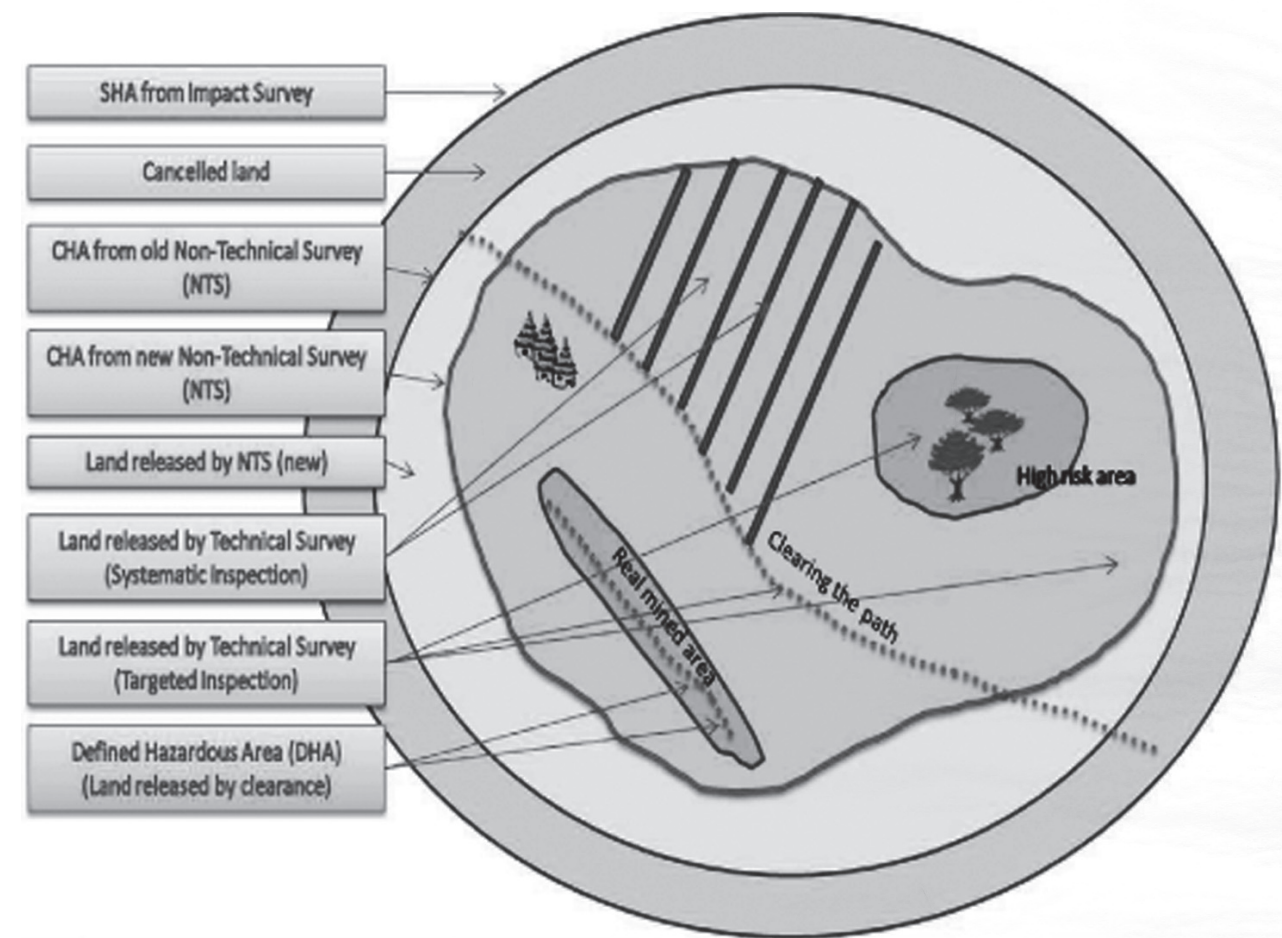
- States Parties should develop national policies and standards that detail the shift of liability from operators to the state after land is released.
- The new International Mine Action Standards series on land release will assist in providing a global set of terminology. Terms interpreted differently by stakeholders should be clarified or not used at all.
- States Parties that are required to prepare extension requests should explain how clearance and other forms of land release will be applied during the period of the extension.
- States Parties are encouraged to release more land by survey processes.
- The release of land by Non-technical and Technical Survey is not a shortcut to implementing Article 5.1, but rather a more appropriate way to fulfill obligations, provided that the survey can confidently conclude that land is mine-free.

The Ottawa Convention requires the removal of all known mines in a specified timeframe while acknowledging the need to prioritize different areas in this process. The Convention is a political instrument that does not directly interfere with the operational aspects of mine action, but the focus on Ottawa timeframes has drawn discussion on whether current operational practices are adequate.

Purpose of Land-release Methodology

Any land-release concept should provide an appropriate framework for decision-making, a method of addressing legal and policy aspects, a way of defining appropriate technical solutions, and the promotion of sector-wide use of land-release principles. It should also prevent future inflation of the landmine problem by offering methods that more accurately define the real boundaries of mined areas before clearance assets are employed.

A good land-release concept does not always need to be detailed and formalized. A balance is between the need for simplicity, the validity of the concept and increased efficiency. The simplest form



1. If an Impact Survey or non-evidence based survey (such as an initial assessment) has been undertaken prior to a Non-technical Survey, the difference in size between the two areas (the SHA minus the CHA), may be reported as Cancelled land.
2. If a new Non-technical Survey replaces an old, and the new CHA is smaller, the difference may be reported as Land Released by Non-technical Survey.
3. If targeted Technical Survey has been applied, the area that was inspected as well as the areas that were not inspected may be reported as Land Released by Technical Survey. The targeted inspection has increased the confidence for the entire area from which target areas were selected.
4. If systematic Technical Survey has been applied, the exploration lanes and the intervening areas that were not physically verified may be reported as Land Released by Technical Survey if no mines were found. The exploration lanes have increased the confidence for the entire area subjected to systematic inspection.
5. If mines are found during the Technical Survey, clearance will be undertaken. It may be considered part of the Technical Survey because it helps to define the boundaries of the Defined Hazardous Area (DHA). A DHA (mined area including buffer zone) may be reported as Land Released by Clearance.

of land-release methodology is already in use, but it has repeatedly failed to be efficient. For example, Non-technical Surveys have typically failed to collect and assess information in order to justify the release of land or define the minimum Technical Survey requirements.

International Mine Action Standards

Three IMAS drafts on land release have been developed in response to growing concerns about excessive clearance of mine-free

land. The IMAS Review Board has reviewed and accepted the drafts, and they are currently awaiting final endorsement from the Inter-Agency Coordinating Group for Mine Action. According to the IMAS Web site, where the drafts are currently posted, "The content has effectively already been accepted by the mine action community and as such they can be used with immediate effect."¹ Minor changes may still occur, but the bulk is likely to remain unchanged.

- IMAS 08.20 explains the principles of land release and details the responsibilities of donors, governments and operators in the context of land release. It further explains how the different

components of survey and clearance should be viewed and how they can be combined to ensure efficient land release.

- IMAS 08.21 explains the principles of a Non-technical Survey and how and when land can be released by it.
- IMAS 08.22 explains the principles of Technical Survey and how the requirement for it can be defined by building on evidence already gained through the Non-technical Survey process.

Once endorsed, the three IMAS standards will form a useful framework for a wider use of land-release methodology.

Terminology

Attempts have been made in the draft IMAS to resolve issues relating to terminology by introducing new terms, providing definitions of the most commonly used terms and discouraging the use of redundant ones.

The proposed terminology aims to promote a broader understanding of land-release principles. The most important terms are discussed below:

- *Non-technical Survey* is the new IMAS term for what was previously called General Survey, Polygon Survey, Level One Survey or Baseline Survey. It is a non-intrusive investigation into whether an area is mined or not.
- *Technical Survey* is a technical investigation using demining assets to collect information for further assessment. The purpose of Technical Survey is to more accurately define the mined areas while also building sufficient confidence that the remaining areas are mine-free.
- *Clearance* should be the method of last resort in the land-release process. An effort should be made to release as much land as possible by survey processes in order to limit clearance to well-defined mined areas.
- *Suspected Hazardous Area* is an area with some indication of mines/explosive remnants of war but that has not been appropriately surveyed to provide an evidence-based survey conclusion.
- *Confirmed Hazardous Area* is the product of an evidence-based Non-technical Survey and a polygon that defines the boundaries of the suspected area.

- *Defined Hazardous Area* is the product of a Technical Survey. A DHA is the area that will end up cleared regardless of whether it was initially defined by Technical Survey.

Basics of Evidence-based Survey Components

The crucial question in both Non-technical and Technical Survey is how to define when there is enough information or evidence to confidently consider an area mine-free or mined. In the absence of appropriate decision-making criteria, the estimated size of a SHA is easily exaggerated because there is no incentive to do the opposite, but there is apprehension that the area is too narrowly defined.

A sufficiently high confidence that no mines/ERW exist in an area is a pre-condition for land release, and the meaning of the term thus needs to be clearly defined and consistently used. Terms like *mine proofing*, *mine verification* and *risk reduction* typically describe processes that lead to increased confidence in an area or a road being mine-free, but they are seldom quantified and would not lead to formal release of land or roads.

There are inherent inaccuracies in any Non-technical Survey and it may not capture sufficient information to justify many defined levels of confidence. Moreover, if it is impractical to use more than a few Technical Survey levels, a Non-technical Survey defining more levels of confidence is redundant. Overall survey confidence can be defined by assessing the value of information provided by the informants, weighting each and adding them to determine an overall rating of confidence. The scoring and the value of the information rely on two factors:

1. Quantitative indicator: The amount of information (basis value of informant)
2. Qualitative indicator: The accuracy of information (degree of trust in individual informant)

Confidence-scoring tables can be used to capture all possible

Terms like *mine proofing*, *mine verification*, and *risk reduction* typically describe processes that lead to increased confidence in an area or a road being mine-free, but they are seldom quantified and would not lead to formal release of land or roads.

informants and assets while giving each of them a unique score and at the same time allowing an adjustment of the scores based on the perceived accuracy of the information.

The principles of defining confidence in Technical Survey are the same as for Non-technical Survey. Confidence in Technical Survey can be found by defining the value of information provided by each asset.

The simplest form of confidence rating has two values: high and low. Considering the survey always endeavors to prove whether an area is mined or not, the outcome from such a survey

will potentially give four options:

- *No mines and high confidence* could be defined as the main criteria for land release because a sufficient amount of reliable information suggests that there are no mines.
- *No mines and low confidence* requires some degree of Technical Survey to boost the confidence to high and allow land release, if no mines are found (which is the likely outcome).
- *Mines and low confidence* requires a higher degree of Technical Survey to accurately define the location of mined areas and possibly allow the remaining parts of the area to be treated as “no mines” with high or low confidence.
- *Mines and high confidence* could be defined as the areas where full clearance is required because the boundaries have been defined.

High and low confidence will allow for two Technical Survey levels:

1. A limited Technical Survey if the Non-technical Survey concludes there are likely no mines
2. A more in-depth Technical Survey if the Non-technical Survey concludes there are likely mines, but at the same time fails to define the exact boundaries

Increasing the number of confidence levels to three would allow four levels of Technical Survey instead of two. Further increasing the number of confidence levels to four would allow six levels of Technical Survey, probably exceeding the accuracy of the Non-technical Survey. The Geneva International Centre for Humanitarian Demining has therefore developed models using three levels of confidence. In these models, the output from the Non-technical Survey is defined as mined or not mined, combined with three levels of confidence defined as low, medium and high.

If the Non-technical Survey suggests there are mines but the boundaries are not properly defined, the main purpose of the Technical Survey is to assist in defining these boundaries. If the boundaries can be defined, clearance is required to gain full confidence that there are no mines in that area. After clearance, the final classification could theoretically be “no mines, high confidence,” justifying the release of that land. Clearance is, however, often undertaken before the boundaries are defined, and the result of the clearance process is the main instrument in defining these boundaries. The clearance process is thus part of the evidence-based survey process. The three processes of Non-technical Survey, Technical Survey and clearance are in fact often concurrent activities, each of which increases confidence that an area is mine-free. The overall output from a broader survey is the product of evidence, or of confidence levels, provided by the Non-technical and

Technical Survey, and even clearance. Convincing evidence provided by Non-technical Survey will require much less supplementary evidence from Technical Survey before land can be released.

Non-technical Survey

The purpose of a Non-technical Survey is to collect information that will determine any Confirmed Hazardous Area, and assist priority setting and the planning of subsequent Technical Survey, clearance, marking and mine-risk education. The output from a Non-technical Survey is purely based on a non-intrusive information-collection process. The survey has the potential to define the minimum requirements for Technical Survey.

Land is not always released by a Non-technical Survey, since it is often the first step in the chain of the evidence-based assessment of the problem. Land can, however, be released if the survey replaces a previous, less accurate Non-technical Survey and the new Confirmed Hazardous Area is smaller. If not, the survey will simply define reasonably accurate boundaries of

The three processes of Non-technical Survey, Technical Survey and clearance are in fact often concurrent activities, each of which increases confidence that an area is mine-free.

hazardous areas and provide information that will assist further mine-action activities.

A way to define confidence in a Non-technical Survey is to develop a scoring table in which each source of information is given a confidence score and the sum of all scores provides the overall confidence rating. Information provided by those who laid mines, mine victims or others who physically observed where mines were laid could, for example, be grouped as firsthand information. Information with decreasing levels of confidence will be classified in the remaining three categories, depending on circumstance.

If three levels of confidence are used to define the accuracy of the Non-technical Survey, six potential outcomes exist:

- *No mines, high confidence*: Land may be released.
- *No mines, medium confidence*: A need for limited Technical Survey before land can be released if the Technical Survey provides further evidence of no mines.
- *No mines low confidence*: A need for normal

Technical Survey before land can be released if the Technical Survey provides no evidence of mines.

- *Mines, low confidence:* A need for increased Technical Survey before land can be released if the Technical Survey provides no evidence of mines.
- *Mines, medium confidence:* A need for extensive Technical Survey before land can be released if the survey provides no evidence of mines.
- *Mines, high confidence:* Land needs to full clearance. The boundaries have been defined.

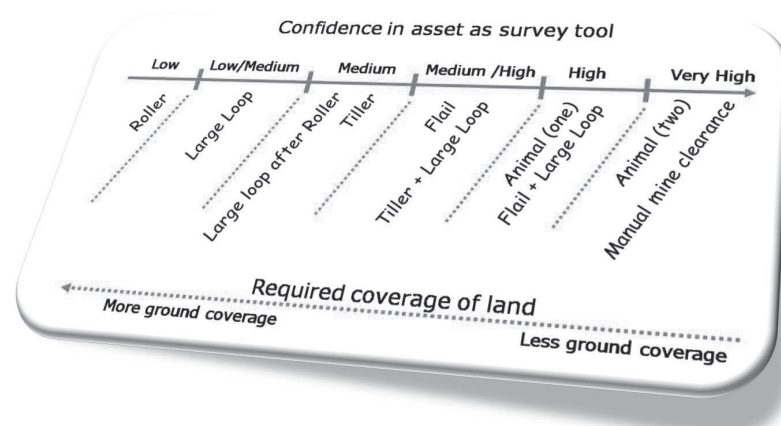
A Confirmed Hazardous Area may be classified as one of the above, but there may be additional gain by subdividing a CHA into several sectors and giving them a unique classification based on the amount of evidence for each. There is thus an opportunity to reduce the requirement for Technical Survey in some sectors based on what the survey reveals in the previous sectors.

A CHA could in theory be divided into an unlimited number of sectors, and several sectors may be given the same classification. It may, however, be useful to limit subdividing. Each of the subsectors should be treated as unique and will require a separate analysis and quantification of information in the survey report.

Technical Survey

Clearance and verification assets are used during Technical Survey, but the intention is to collect information that can be assessed for planning purposes. There are few, if any, universally accepted principles of Technical Survey, and there is scope for significant streamlining of most Technical Survey concepts.

Technical Survey, like Non-technical Survey, can provide measurable evidence about whether mines are present in an area. The amount and quality of evidence can be used to define levels of confidence in the effectiveness of the survey. Information provided by Technical Survey should be viewed in conjunction with information provided by the Non-technical Survey or by clearance (if some has occurred in the area). The type and amount of Technical Survey



If manual mine clearance and two mine-detecting dogs are defined as default accuracy levels, the challenge lies in defining how much additional ground other assets need to cover to provide the same confidence.

will then depend on how much additional evidence is required after Non-technical Survey to gain sufficiently high confidence that an area is mine-free.

It can be difficult to agree on generic scoring values of informants in Non-technical Survey, and this process is no easier in Technical Survey. A combination of test results and empirical evidence can form the basis for developing credible Technical Survey solutions. Governments and organizations should consider establishing "expert groups" to analyze and define the accuracy of assets in survey. Once agreed upon, a more streamlined Technical Survey concept can be developed, preferably in conjunction with a Non-technical Survey concept.

Accuracy of Assets: Qualitative Indicator

Manual mine clearance is the most accurate survey tool. All mines are normally found when manual demining is applied. Using two accredited animals to detect mines is also considered clearance by IMAS. Confidence in the survey, however, is due to the accuracy and the quantity of information.

IMAS defines the use of two accredited animals as clearance, but how much information will one accredited animal provide? The quality and accuracy of animals differs considerably between organizations, impeding the process of defining a generic scoring value for the use of one animal. The fact that less reliable mine-detecting dogs are currently used in survey assessments is a concern, but it is more a management problem than a generic problem with dogs. If we assume only well-trained, tested and accredited dogs are allowed for use, we can define confidence in the use of one animal in Technical Survey as fairly high. Evidence suggests that well-trained animals will find most mines, if not all.

A similar algorithm can be used for machines. A crushed mine, while acceptable in clearance, may not provide any record-

able information in survey. Thrown-out mines, while unacceptable in clearance, can normally be spotted on the ground and recorded during survey. Testing of flails shows that most of them will crush or detonate between 94 and 98 percent of all anti-personnel mines and a high number of anti-tank mines. They typically fail to detonate unexploded ordnance, but they often slash off the fuze. Experience in the field, however, suggests fewer mines are crushed or detonated than during trials. There may be a discrepancy because flails are sometimes used on rugged or rocky terrain, or the fuzes are broken and no longer detonate on impact.

More important in survey is how much information flailing will provide. It is necessary to balance the difference in accuracy with an increased ground-coverage requirement during the survey.

The accuracy of other assets like tillers, rollers and low-sensitivity metal detectors (large loops, etc.), can be similarly defined by using a mix of tests and empirical evidence and, as in Non-technical Survey, a scoring table can be developed. The figure on the previous page is an example of how assets can be analyzed and grouped in accordance with the relative level of confidence (accuracy).

If there is a requirement for 50-percent ground coverage by manual mine clearance, the required ground coverage when using one dog is higher (approximately 60 percent), and the required ground coverage when using a flail is even higher (approximately 70 percent).

If the requirement for Technical Survey varies (which will depend on the type and amount of information already provided by the Non-technical Survey or clearance activities), the proportional increase of ground-coverage requirement by other assets can be defined. For example, if there is only a need to cover 30 percent of an area by manual mine clearance, it may be necessary to cover 40 percent of the same area with one dog to gain the same confidence.

While initially it may be a challenge to develop a concept as discussed above, using it can be fairly simple and straightforward in the field. One advantage is that decisions about how much ground to cover are given by the concept and do not need to be defined by field managers for each new task.

Documentation and Handover of Released Land

In the possible event that landmines are found in areas that have been released, the quality of documentation acquired during the decision to release the land may well determine whether an organization should assume liability. Appropriate documentation is

important when areas have been released and "handed over" to the local population or authority after the completion of a survey and/or clearance task. Since land may be released by a combination of concurrent activities, the decisions may change as work on a task progresses, and there is a need to document every step in the decision-making process.

Released land may be removed from the layer in the database that defines the mine/ERW problem, but information about how land has been released should be maintained in different database layers for the purposes of quality control, potential investigation, and operational management and assessment. Just as land is reported released by clearance, land should be reported released by Non-technical and Technical Survey, showing the detailed methods of survey and a documented decision-making process. Many current databases are not configured to capture land released by survey, an issue that needs to be addressed.

Potential Gray Areas

While land release is typically illustrated as a straightforward progression from Non-technical Survey to Technical Survey to clearance, the field process is more composite, and the potential exists for inconsistent reporting and documentation. Some of the gray areas are discussed below:

- Land may be released by the activity that provided the last piece of evidence (confidence) that an area is mine-free. If it was Technical Survey, land may be released by Technical Survey while it may, in fact, have been the Non-technical Survey that provided most information and made up for most of the confidence.
- If clearance leads to the removal of suspicion of adjacent land, clearance arguably justifies the release of adjacent land, since it provided the last piece of evidence. It is better to view the information provided by the clearance activity as Technical Survey and thus report adjacent land as released by Technical Survey.
- If buffer zones around a cleared area are verified by anything less than clearance and this confirmation is deemed appropriate and sufficient, these buffer zones should be reported released by Technical Survey if no mines are found.
- If exploration lanes are made by manual demining teams in Technical Survey, the size of these lanes could be recorded as clearance. Reporting exploration lanes as cleared could discredit the survey process because questions may be legitimately asked about why clearance was applied in one

lane while not on both sides. Thus, it is more appropriate to report the whole area as released by Technical Survey.

- It is essential that the local population trust released land, regardless of whether it has been released by survey or clearance. The methods of releasing land should therefore be discussed with the local authority or population, and a proper hand-over process should be adapted.
- If the local population still suspects mines after land has been released by survey, this skepticism should not prevent release; rather it compels a need for more confidence-building, preferably through better explanation of why the land can confidently be released or, at worst, by applying some degree of physical confidence-building (roller, large loop, etc.).

Conclusion

Land release systematically captures several current but isolated activities and clarifies how each of them is related. A structured assessment of these relationships can lead to improved efficiency. Consistent use of the term and all its facets has the potential to improve the quality of the individual components. It will inevitably take some time before land release is universally understood, as there is no one uniform method for its application. Land-release methodology is, however, a useful instrument to better define and subsequently resolve the landmine problem. Ottawa Convention States Parties may find this tool particularly useful when assessing their own compliance with the Convention or when there is a need to prepare extension requests. ♦

See Endnotes, page 62



Håvard Bach heads the Operational Support Unit for the GICHD. Projects under his responsibility currently include studies on mine-detection dogs, mechanical mine clearance, manual mine clearance and risk management. He also gives consultancy advice, often related to operational demining activities and demining technology. Prior to employment at the GICHD, Håvard worked as a Norwegian military engineering officer before being employed by Norwegian People's Aid, managing several mine-action programs worldwide.

Håvard Bach
Head, Operational Methods Section
GICHD
7 bis, avenue de la Paix
P.O. Box 1300
1211 Geneva / Switzerland
Tel: +41 22 906 1670
E-mail: h.bach@gichd.org
Web site: www.gichd.org

Could Local Agricultural Machines Make a Country 'Impact Free' by 2010?

by Emanuela Elisa Cepolina [Snail Aid-Technology for Development] and Matteo Zoppi [University of Genova]

Many countries affected by landmines are also facing food crises, underscoring the necessity of cost-effective mine removal. Converting agricultural machines already available in many mine-affected countries for use on mine-action projects saves not only time but also money by speeding up the removal process and turning the land back into an agricultural resource.

An important milestone for the mine-action community was reached in March 2009: the first deadline for the mine-affected countries that signed the Ottawa Convention in 1997 to complete clearance. Unfortunately, two-thirds of them did not meet their obligations. Fifteen countries, including Bosnia and Herzegovina, asked for deadline extensions of one to 10 years, leaving a large percentage of their territories unsafe, and forcing their weak economies to support expensive mine-action activities for longer periods of time.

The year 2009 also saw many people around the world starving due to a global food crisis that started two years before. Different sources estimated, for example, that almost one-third of Tajikistan's 6.7 million inhabitants would not have enough to eat last winter.^{1, 2} Many more landmine-plagued countries, such as Burma (Myanmar), Egypt, Mozambique and Somalia, are also facing famine.

The need for quick land release of suspected or mine-affected land for agricultural and grazing use is growing. If a move toward cheaper and more efficient mine-action practices has always been desirable, it is now an imperative.

As often happens, during crises, solutions arise. In fact, we are currently witnessing a dramatic change in mine action: the acceptance and standardization of persistent residual risk after clearance³ and opposition to the traditional requirement under the Ottawa Convention of removal and/or destruction of all mine and unexploded-ordnance hazards from the specified area to a specified depth.⁴

General and Technical Survey

In light of the need to fulfill Ottawa Convention obligations and the pressing need to return cleared land to local populations, the land-release concept aims to use current resources more efficiently by better managing information and defining the actual size of minefields so that expensive resources and equipment can be devoted to high-risk areas. Clearance is generally⁵ limited to only 3 percent of the entire Suspected Hazardous Area processed. The remaining area that is released through General and Technical Survey is not physically cleared, or at least not completely, and therefore contains an element of risk that explosive hazards may remain. Full clearance activities will not guarantee that an area is completely free of mines, and land released after area reduction is generally considered to contain a higher residual risk.

Nevertheless, area reduction through General and Technical Survey is increasingly being used in many programs around the world, such as Cambodia and Mozambique. This important shift toward the acceptance of a residual risk after clearance allows for treatment of the problem in terms of risk management and the substitution, at least partially, of full clearance activities with a combination of cheaper and less thorough (and thus less reliable) methods to lower the risk to a tolerable level. A tolerable risk is defined as a risk that is accepted in a given context based on the values of the society being assisted, and a re-definition of the problem from a global to local scale.

News Brief

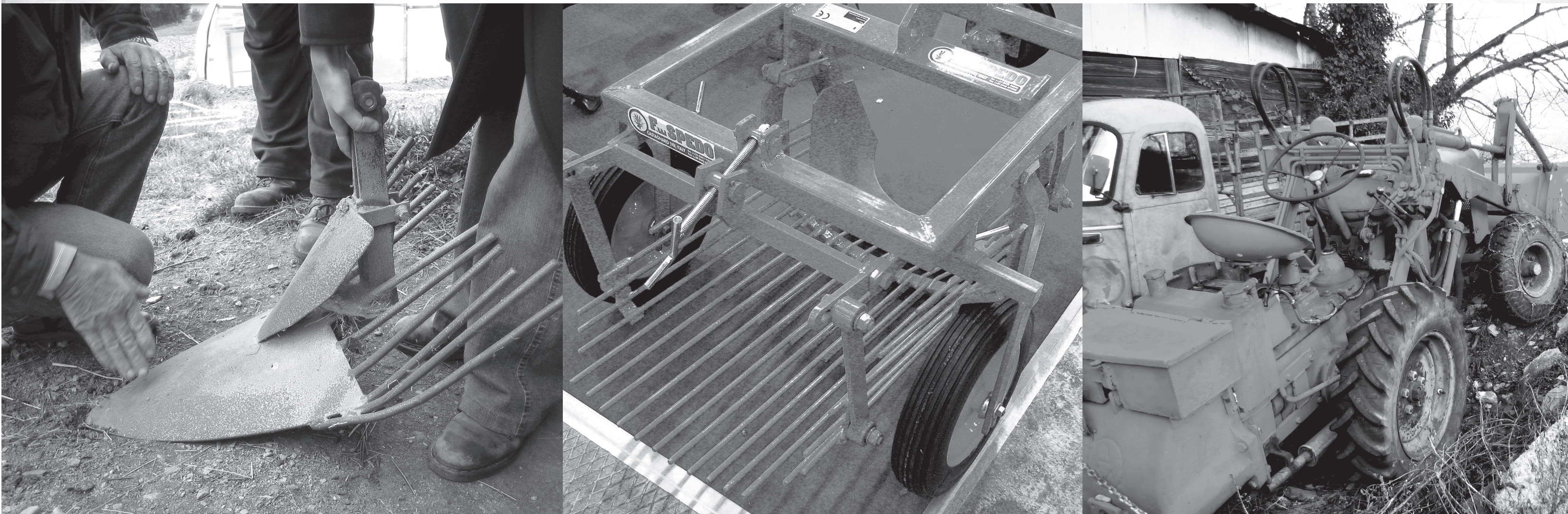
ANAMA Working with Intergovernmental Agencies

The Azerbaijan National Agency for Mine Action has been active in 2009, working alongside numerous intergovernmental agencies in training and support for mine-action initiatives. The summer of 2009 saw ANAMA work directly with mine-action programs in Afghanistan, Tajikistan and Georgia, helping to train their personnel, as well as providing direct assistance to mine-action officials.

In July 2009, four members of the Tajikistan Mine Action Centre, including mine-victim and mine-education specialists, visited ANAMA to develop skills and knowledge on mine action. These specialists went through training with ANAMA officials and toured the ANAMA office, where they received a certificate of completion for their training.

ANAMA also worked with Afghanistan in the summer of 2009, with officials from both ANAMA and Afghanistan's National Disaster Management Agency Department of Mine Clearance, visiting each other's mine-action centers. To help Afghanistan sustain a national mine-action program, ANAMA will hold job trainings for national management-level positions. July and August saw these first training sessions take place, with ANAMA holding mine-clearance training on its regional bases.

Finally, ANAMA specialists, in joint cooperation with the International Trust Fund for Demining and Mine Victims-assistance, held training operations for the Georgian Ministry of Defense and Ministry of Internal Affairs through July and August. These sessions were held in the hopes of building Georgia's capacity for a mine-action program while furthering the partnership between ANAMA and the ITF.



Above and opposite page: Examples of agricultural machines that could be employed in Technical Survey operations with only minor adjustments.
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This redefinition might be the first step toward the achievement of a more efficient and sustainable solution for area reduction, leading to a higher respect for local traditions and biodiversities that is already occurring in many fields outside of mine action.

Demining Machines

According to the *Mechanical Demining Equipment Catalogue*,⁶ produced by the Geneva International Centre for Humanitarian Demining in January 2008, there are fewer than 650 demining machines working in mine-action programs around the world. The market for humanitarian-demining mechanical technology is small and driven by donors rather than mine-action programs or

operators. Machines included in the catalog are expensive, with specialized equipment designed to destroy mines with massive weight, heavily armored to be safe for the operator, or equipped with complex control systems for remote operation. Buyers of these technologies are often donors rather than program coordinators. Machines are marketed in the same way as military equipment, and prices are often part of packages that are negotiated in private. Therefore, cost and number of units are not comparable to those of other demining technologies directly bought by programs, such as sensor technologies.⁷

The performance test described by *Comité Européen de Normalisation* Workshop Agreement 15044 estimates that a single machine can withstand 450 landmine explosions in the same trial. Machines to be employed in Technical Survey mainly need to verify the absence of mines in the given area. If they encounter an explosion, the area needs to be re-categorized and fully processed by proper clearance. This means that machines used in Technical

Survey must be able to process the ground and to resist—or not be severely damaged by—only one explosion at a time, while keeping the operator safe. Thus, the specifications to which dedicated demining machines are designed are unnecessarily strict for Technical Survey.

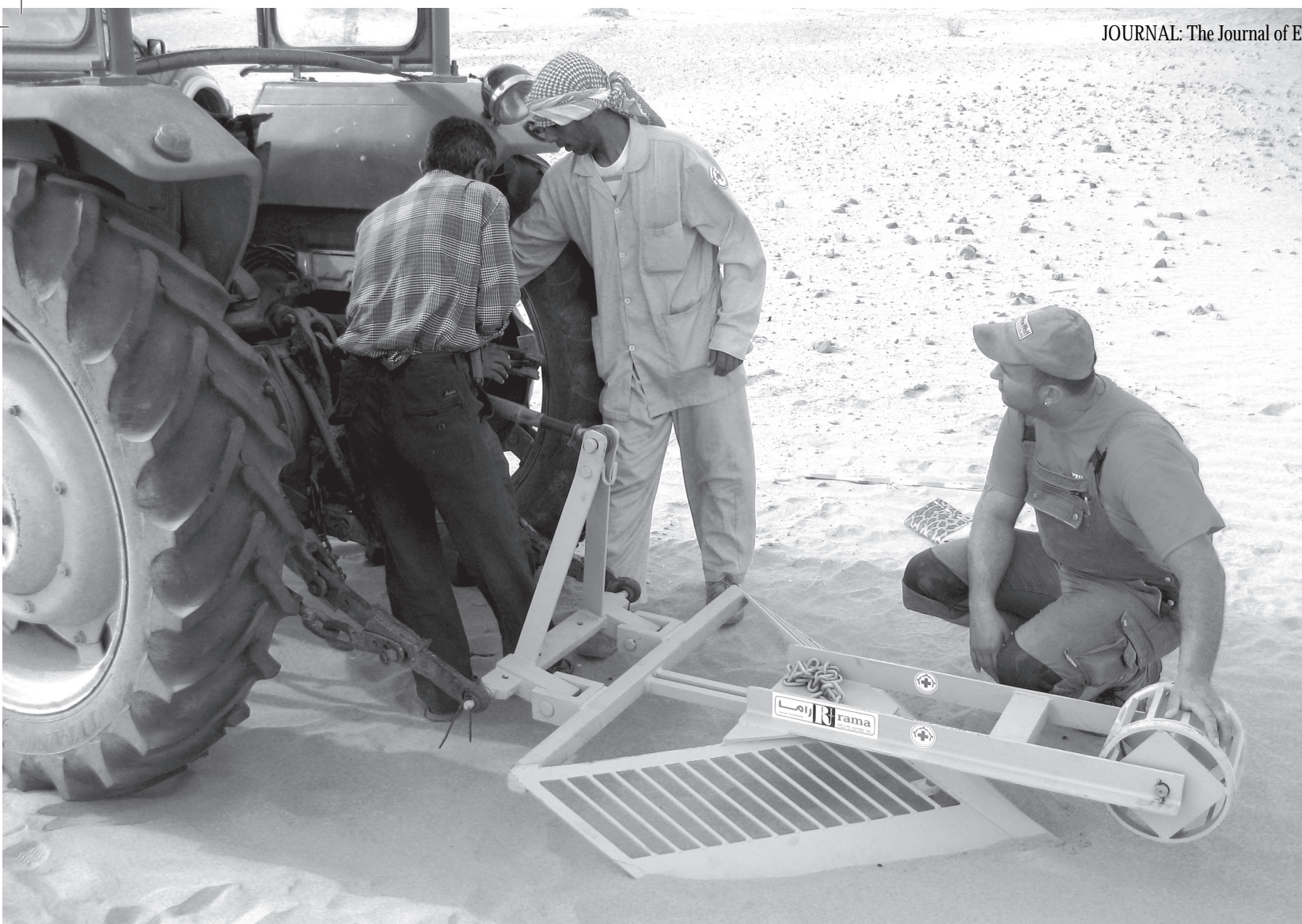
Stringent requirements for demining machines, including being able to withstand hundreds of explosions in one trial, are the main reason for high prices and limited use. As production is also limited, demining machines have to address the widest variety of scenarios possible, resulting in highly complex mechanics and poor local maintainability. They represent a solution to the problem that is more global than local; therefore, while a demining machine's cost and robustness can justify its use where full clearance is needed, other less expensive and more widely available machines need to

be developed for gathering the information required to release land through Technical Survey.

Local Agricultural Technologies for Land Release

In this context, it is important not to introduce newer technologies dedicated to demining, but to use locally available ones whenever possible. Machines developed or re-adapted locally have lower initial costs, shorter downtime and lower repair costs. It stands to reason that machines produced outside a local area would also be underutilized due to the lack of spare parts or the expertise needed to fix them.

Local machines are also much more sustainable than imported technologies, which are often designed with little consideration for local condi-



Above and opposite page: Test of the ground-processing tool designed by Snail Aid and the University of Genova in Jordan. The tractor unit here is a tractor hired locally and driven backwards.

tions. Current, expensive technologies and labor-intensive manual-demining practices can be used to clear land that is not otherwise released. The largest possible quantity of new, simple, and less-robust technologies, available locally, can be used for what was formerly called *area reduction* and is now referred to as *land release by Technical Survey*. As long as no machine is expected to conduct clearance without manual or mine-detection dog follow-up, a wide range of machines can be used to prepare the land for release.⁸ In fact, a quick solution to the landmine problem could already be available in mine-affected countries.

As their job is to process the ground, agricultural machines could be efficiently employed. Agricultural technologies are largely available and come in different sizes. Where they are not already available, their presence might be desirable not only in mine action, but also to increase food production, as agricultural machines used in demining can be reconverted for agricultural needs when they are no longer needed for clearance. As mine-affected countries are traditionally agricultural-

ly based, some agricultural resources are already available. Nevertheless, investments in agricultural research and development are key to addressing other serious problems such as climate change and soil erosion. If we agree on the need to provide appropriate and sustainable solutions that consider the environmental, cultural, social and economical contexts in which they will function, then we should also consider the future of the countries in which these technologies will work.

By introducing facilities capable of adapting agricultural tools to demining activities, we can support research and development in agriculture. As suggested by the National Bank for Agriculture and Rural Development,⁹ to achieve the desired average farm power availability of two kilowatts per hectare (about 2.5 acres),¹⁰ agricultural service centers could be established. There, machinery could be provided as and when needed on a custom-hire basis to farmers on small- and medium-sized farms who cannot afford to purchase their own machinery. In the same manner, these agricultural service centers could also provide machines for Technical

Survey. They could develop the modifications required to effectively address the demining problem locally, then acquire these machines and provide assistance.

Agricultural machines have long existed and can be repaired in every developing country in local workshops. The adaptability of agricultural technologies is another advantage; the same tools can be mounted on different tractor units and replaced by dedicated agricultural tools when demining operations are over. Involving local technicians in the redesign of new or improved technology also helps reduce dependency of local communities on donor assistance, as well as facilitates local human development—satisfying basic human needs and capabilities.¹¹ Empowerment is an integral part of many poverty-reduction programs. It is essential not only for the state to provide resources and opportunities, but also for citizens to take responsibility for self-improvement. It is desirable and neces-

sary for local entities to assume mine-action activities so that a local capacity may be developed for the use of agricultural technologies in land-release activities.

Adapting Agricultural Technologies to Technical Survey

Agricultural machines need to be adapted to the demining task. Special tools for ground processing at the required depth might be attached to standard linkages, such as three-point linkages on tractor units. In many cases, the explosive threat a SHA poses will be known before operations start. Information collected from local sources can help define the specific threat an area might contain. Even if not designed to withstand anti-tank landmine explosions, machines must keep the operator safe. This aim can be achieved in two ways: by operating the machine remotely or by isolating the operator from the machine structure when driven manually. While a simple remote-control system can be realized in a modular way, relatively inexpensive¹² and semi-autonomous machines are considered a key element in improving total quality management in mine action.¹³ To keep the operator near manual machines, either on board or driving it by handling

it from behind, it is necessary to install shock isolators between the handler or driving wheel and the machine structure. If supporting an on-board operator, the seat must also be isolated from shock waves caused by explosions.

Another key issue in adapting agricultural technology to Technical Survey is armoring. If the machine is equipped in a way that supports tools at the front, only a light shield may be needed to protect the delicate parts. Otherwise, if the machine is originally conceived to support tools at the back, as is frequently the case, then a system to protect the undercarriage from possible damage caused by the explosion of mines must be implemented. A good approach in this case is to design special blast-resistant wheels that do not transmit the shock associated with an explosion to the chassis either by deforming flexibly or by releasing energy through frictional pins. Research on blast-resistant wheels, shock isolators and modular remote-control systems, if flexible enough to be adapted to different agricultural machines, would benefit Technical Survey processes enormously.

The Case of BiH

According to the *Landmine Monitor Report 2008*, 170 square kilometers (42,000 acres) of land were released to public use through area reduction in Bosnia and Herzegovina in 2007, using 21 accredited demining machines.¹⁴ The estimated area that still needs to be cleared consists of 1,738 square kilometers (430,000 acres). If we look at the number of agricultural tractors in the country, approximately 30,000 units,¹⁵ and we imagine temporarily equipping 300 of them, i.e., 1 percent of all units available, with low-cost ground-processing tools and light armoring for assessing the

presence of landmines, assuming that each one could have the same productivity of one of the 21 machines used for area reduction in 2007 (around eight square kilometers [three square miles] per year), the problem of landmines in BiH could be potentially solved or drastically reduced to small, confined, highly contaminated areas in less than one year.

Conclusion

As under-developed countries continue to be affected by the world food crisis, the need for arable land is increasing. Research into more responsible agricultural practices is also becoming an imperative to fight the dramatic consequences of climate change. Investing in the redesign of local agricultural technologies can both speed up mine clearance and improve the future for mine-affected countries by addressing these other challenges simultaneously. By approaching the issue on a local instead of global level, more appropriate, sustainable and reasonable solutions can be achieved while fostering the empowerment of local populations. ♦

See Endnotes, page 62



Emanuela Elisa Cepolina recently completed her doctorate in mechanical engineering. She has been researching technologies for humanitarian demining since 2003—first at the University of Genova, and recently as president of the nascent nonprofit association Snail Aid-Technology for Development.

Emanuela Elisa Cepolina
Snail Aid-Technology for Development
Via Cabella 10/12, 16122
Genova / Italy
Tel: +39 010 4042 019
Mobile: +39 333 1655 089
E-mail: emacepo@dimec.unigeit,
ceppo79@hotmail.com
Web site: <http://www.snailaid.org>



Matteo Zoppi is a researcher in the Department Mechanics and Machine Design at the University of Genova, PMARlab Robotics Group, with research lines on development, design, fabrication, and testing of mechatronics and robotics systems for industrial and service applications, application-oriented synthesis and design, and methods for analysis—in particular kinematics and singularity analysis, and design of Micro Electrical Mechanical Systems.

Matteo Zoppi
Researcher
Department of Mechanics
and Machine Design
University of Genova
Via All'Opera Pia 15A
16145 Genova / Italy
Tel: +39 010 3532 837
E-mail: zoppi@dimec.unige.it



Is she working in the right place? Is she doing the right work?
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Reflections from the Field: Lao PDR, Surveys And Land Release

by Stephen Pritchard [NPA-Laos and UXO Lao]

With an example and a discussion of Norwegian People's Aid's work with UXO Lao in Lao PDR, the author explains how choosing the right tasks and performing the tasks correctly can allow land to be released safely and confidently.

In mid-September 2008, the Lao National Unexploded Ordnance Programme's Operations and Quality Management units joined a survey¹ team in Khammouan, a province in the middle of the Laotian panhandle. A farmer had written a letter requesting the clearance of unexploded ordnance for his land. It was a typical dreary Indochinese afternoon at the end of the rainy season: muggy, drizzly, heavily rutted roads and crops at full growth ready for harvest. Recent floods, the worst since recording began in 1922, had devastated the agricultural output of the Mekong basin. Fortunately, the farmer's corn crop was safe from the rising waters; his corn had avoided the fate of the thousands of acres of immature rice that had fallen prey to the floods the previous month.

An Unusual Discovery

Looking at a map, one would assume that the farmer's land would also be free from another common risk, UXO. The nearest bombing was over five kilometers (three miles) away and, although the available data is incomplete and inaccurate, it generally gives a positive correlation among accidents, contamination and poverty. UXO Lao's management team at Tha Khaek, the provincial capital of Khammouan, thought this land would have a negligible threat of UXO and suspected that the farmer's fear was based on vague "rumors" that circulated among the locals.

On meeting with the survey team, the farmer pointed out the boundaries of the land and explained why



Farmers in Lao PDR regularly find “bombies” in fields that have been used for several years.

he thought it should be cleared. He had found a large piece of sharp metal and assumed it was fragmentation from a piece of UXO. When questioned by the survey team, however, the farmer admitted that the land around his was in use; he did not know of any ground fighting that took place in the area; and he had used this plot of land for 10 years without finding UXO.

There were no credible indicators of ground battles or bombing besides the single fragment of metal. We all agreed that full clearance would be wasteful and believed the farmer simply needed a team to “check his land” as a confidence-building measure. The visit of the survey team in itself increased his confidence in using the land,

and a follow-up Technical Survey was scheduled for the 2009 work plan.

Surveys

Considering the requirement by most donors for using funds effectively, the solution should have been land release by Non-technical Survey, which is different from the solution chosen above. The planned Technical Survey visit by a team wielding detectors would not affect the farmer’s use of the land because he was already using the land. At the time, UXO Lao had yet to adopt land release by Non-technical Survey (adopted in 2009).



X marks the spot: A “bombie” lies near a fruit plantation. Five years ago, many clearance tasks were yielding no UXO.

In the past year, I have joined several such surveys with UXO Lao. In most cases, the need for full clearance is beyond question. There are, however, occasional requests for the threat level requires clarification by Technical Survey or which no further action is required. This depends on the land user’s willingness to accept the decision, as the goal of land release is to instill confidence that land is safe for use based on a thorough assessment. Technical Survey and clearance are more productively directed toward situations in which UXO contamination is highly suspected.

Major international nongovernmental organizations, such as The HALO Trust, have made significant



Beneficiaries matter. Land release re-distributes limited clearance capacity: It’s not just about reducing polygons using a checklist.

inroads into reducing “exaggerated” contamination records using sensible field survey and database review. Across the humanitarian sector in general, such credible efforts have tended to be in isolation; most surveys have focused on capturing all Suspected Hazardous Areas.

Lao PDR is different—there is no comprehensive database of polygons.² The raw contamination data is based on 40-year-old U.S. Air Force bombing records, the accuracy of which is mediocre at best, given the technological limits at the time of the fighting. The original Landmine Impact Survey conducted by Handicap International in 1997 has never been followed by a comprehensive attempt to measure or record UXO contamination. Despite the stipulations in Article IV of the *Convention on Cluster Munitions*, which Lao PDR has signed and ratified, no such effort is planned. Perhaps the condition of the databases in other mine-affected countries serves to dissuade rather than encourage “baseline survey.” The sheer quantity and impact of bombing and ground fighting in Lao PDR far exceeds that of most other countries.

Land Release

Land release is the process of changing the status of known or Suspected Hazardous Areas to released land using Non-technical Survey, Technical Survey and/or clearance in the most relevant, effective and efficient manner. Land can be released within a former SHA by gathering sufficient information to confirm the absence of mines or UXO in the area with a high degree of certainty and, therefore, recommending that suspicion of mines/UXO should no longer prevent the local population from using the land. The concept of land

release emerged because many clearance operators constitute a relatively expensive and time-consuming clearance capacity for land with limited or no mines or UXO. In many cases, the original data reflected the best information and tools available at the time. Subsequent reviews after years of increased land use and shifting indigenous attitude regarding risk and mine-action activity changed the perception of these recorded areas. In other cases, an inaccurate original survey is blamed for over-stating the contamination; land release has generally resulted in the **reduction** of land requiring expensive area clearance. If someone suspects land is contaminated, we have to do **something** but not always **clearance**. Non-primary clearance tools such as machines and canines are also used as land-release methods.

While land release in itself is not a new concept, incorporating it as a national policy including survey is new. Land release by clearance has been the only available response option in many countries, including Laos until 2007. Though commercial organizations have applied land-release methodology for decades in their own operations, only recently has it been recognized by some host governments. The notions of a consistent methodology and thresholds of risk tolerance certainly are only just emerging in several countries, even those with long-established mine-action programs. The challenge facing the sector is to make sure it does the right job, without adding extra layers of confusion.

Government and Clearance in Laos

Broadly speaking, clearance in Laos is reactive rather than proactive. Some international NGOs and companies conduct their own prioritization, and most work for clients or development partners who are risk-averse and restrictive in the services they will pay for. At the operational level, task perimeters are defined by consensus between survey teams and those who request clearance. However, this will not capture contaminated areas adjacent to the area presented for clearance. As shown in the above example of the farmer with one piece of metal on his land, records have shown that some of these requested areas have had no contamination at all. Under such a client-driven system, the prioritization process is (arguably) participatory; however, the effectiveness of the work is at the mercy of the requests.

The biggest threats to effective land release, as with clearance, are **maintaining consistent management focus** and **resources**. Without adequate resourcing, there will not be sufficient monitoring of field activity to ensure effective land release. The “great idea” purported

by land release is relegated to a well-meaning paper exercise. Without good activity and policy, release by the wrong means may occur. Land release alone is no substitute for a well-supported, sensibly-recruited and sustained management with good “field time,” as well as administrative competence. A dedicated staff is needed to visit the field, review decisions and ask, “Are we doing the right job, the right way?” The good news is that the cost of maintaining such capacities is, in the long run, dwarfed by the cost of ineffective solutions to seemingly endless polygons or “dodgy requests.” The need for consistent oversight of field operations increases with organization size. In UXO Lao’s case, with 960 staff, a strong central “ownership” of operational policies is important.

Recognizing the need to encourage reform, the United Nations Development Programme, NPA and the Geneva International Centre for Humanitarian Demining began to collaborate on two main projects. In 2005, NPA and UXO Lao conducted a study called “Enhancing the Technical Survey.” This led to the Enhanced Technical Survey project, aimed at supporting UXO Lao as it embraced effective land release. The first step was to introduce a Technical Survey that would discourage full clearance if no UXO was found. Secondly, a revised Non-technical Survey was devised to enable land release in the rare cases in which there were no indicators and also to provide baseline data for post-clearance assessment. (Both were absent before: UXO Lao was literally a clearance agency.) At the national level, GICHD developed a risk model to support consistent land-release decisions by clearance operators. Both projects, although technical rather than cross-cutting, resulted in a sustained management focus on selection of UXO area-clearance tasks. Between 1999 and 2004, a sample of 2,000 records showed only two-thirds of UXO Lao’s area-clearance tasks yielded any UXO; by 2007 and 2008, over 98 percent did. The positive implications for aid effectiveness are obvious—UXO Lao is the largest recipient of bilateral donor funding in Lao PDR and is a significant recipient of multilateral resources. This does not signify that a perfect land-release model has been bequeathed to UXO Lao by a handful of international advisers; it shows those precious resources are now having a considerable impact. UXO Lao has come a long way in using donations wisely, especially in the past four years.

Tolerance

The periodic review of risk-tolerance thresholds is important. “Targets” must be avoided. Land-release performance is not measured in square meters but in

the quality of the decisions. Right now, the tolerance-to-action correlation for UXO is:

- If there is reliable, first-hand evidence of UXO in or immediately around the land, or in the land where an accident occurred, the land is subject to clearance.
- If there are rumors of UXO, accidents, battles, military positions or bombings in or around the land, Technical Survey is applied.
- If there are no indicators, the land is released following a Non-technical Survey.

The above thresholds cannot capture and account for every eventuality. For instance, what if UXO in the land was not *in situ*? What if there are gaps in released bombing data? What if nobody is available who was in the area during the war? Thankfully, UXO Lao employs staff with 15 years of operational experience. It is arrogant to assume that they would not be able to consider such practicalities, and I have every confidence that they usually make the right decision. However, these decisions have to be reviewed consistently and with a self-critical eye to ensure effectiveness.

Conclusion

This tale is not a complete success story; it is ongoing. Enabling our national counterparts to adopt a new attitude toward risk—and a significant change in the way decisions have traditionally been approached—is not easy in the West, let alone in Lao PDR, which has seen decades of inconsistent, and occasionally incompetent, foreign assistance. The capability gap of nationally-owned operational analysis, maintenance of standards and monitoring presents a significant constraint to the ef-

fective application of land-release concepts. Finally, many of these improvements have been driven by several foreigners who have put it on themselves to encourage our counterparts to adopt a seemingly alien policy. This is a policy that puts **their** heads, rather than Technical Advisors’ heads, on the block for key decisions. I can see why it has taken some time to implement this, but in the long run, it will be worth it.

GICHD, UNDP and NPA have invested time, effort and generous donor resources into encouraging land-release policy. Different methods have been employed and the end result has been a sustained focus on sound risk management and effectiveness of clearance work. UXO Lao now has a policy of land release consisting of not only clearance but Technical and Non-technical Survey. The methodology incorporates the GICHD risk model as well as elements of NPA’s project formerly known as Enhanced Technical Survey. Ideally, it will be used consistently and sensibly. Realistically, its success depends on many factors, some of which seem unlikely to be fulfilled in the immediate future.

NPA has decided to end its land-release support project with UXO Lao. In some measures, the project already achieved its goals and in others, there remain roadblocks to its success. But the 80/20 rule³ applies, and international agencies are not here to substitute for national leadership. So on this cheerful, yet imperfect note, UXO Lao will take the baton in this relay. The race will never really be over, but that baton has finally changed hands. ♦

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Stephen Pritchard is a mine-action professional from Reading, United Kingdom formerly. Formerly employed as a Program Manager with Norwegian People’s Aid, he has spent the last year assisting UXO Lao with survey and land-release issues. He is currently searching for new opportunities.

Stephen Pritchard
Former Program Manager
Norwegian People’s Aid Laos & UXO Lao
E-mail: stevepritchard5@hotmail.com
Web site: <http://www.npaid.org>,
<http://www.uxolao.gov.la>

Land Cancellation and Release

by Parviz Mavlonkulov [Tajikistan Mine Action Centre]

Initial surveying and resurveying of areas contaminated with mines are imperative processes in the Land Cancellation and Release process in Tajikistan, where estimates indicate thousands of acres of Suspected Hazardous Areas. It is necessary to re-survey contaminated areas is necessary to ensure accurate results. Even with limited funds, the Tajikistan Mine Action Centre has made great efforts to release the land and promote mine-risk education, victim assistance, and capacity building.

In the land-release process, initial surveys play an important role, providing the main information regarding the impact of mined areas. All plans regarding Technical Survey, clearance, mine-risk education, victim assistance and other mine-action activities are developed according to the data collected during the initial survey. If the data is accurate and reliable, it will be used throughout the duration of the mine-action program's existence. If the data is inaccurate, the areas will be unable to be considered fully cleared (though it is possible that a large percentage of the area is safe), and it will be time-consuming to re-conduct survey operations in the areas that have already been surveyed. Though multiple survey operations require additional expenditures, they are necessary and should be conducted periodically for verification, confirmation, cancellation or reduction of areas, according to the applicable criteria.

Extent of the Problem

In Tajikistan, 456,790 people approximately currently live in mine-affected areas, approximately 70 percent of whom are women and children.¹ Hazardous areas are usually located in hills and mountains where most villages are located, causing a negative impact on development in these locations. Usually the threat from mines and unexploded ordnance, including unexploded cluster munitions, is greatest in the summer, when people travel to mountain areas to pasture their sheep, collect wood and stones, pick berries, harvest grass and perform other activities related to normal rural life.

An initial Impact Survey carried out by the Tajikistan Mine Action Centre's partner, the Swiss Foundation for Mine Action, from 2003–2005 identified 146 Suspected Hazardous Areas covering 49,637,637 square

meters (12,266 acres). Following the Impact Survey, requests for clearance and Technical Survey from the government, local authorities and ministries identified an additional 13 SHAs covering 858,018 square meters (212 acres). Also, during initial clearance operations, an additional 172,617 square meters (43 acres) were recorded. Therefore, the original total suspected land-mine contamination of Tajikistan included 159 SHAs covering 50,668,272 square meters (12,520 acres).

Due to the inexperience of the initial survey teams, lack of minefield records and other important information, and paucity of proper survey equipment, the first Impact Survey did not yield high-quality results. The sizes of SHAs were miscalculated and their descriptions were not clearly recorded. In addition, because the Tajik-Afghan border was guarded by Russian forces, access to border areas was limited. Likewise, access to areas along the Tajik-Uzbek border was and remains limited. For this reason, resurvey of these areas is necessary.

Using minefield records, TMAC is conducting resurvey operations along the Tajik-Afghan border. By the end of 2009, resurvey operations there will be completed and the mine-action program will have full and reliable information on mine-contaminated areas in the region, as well as in the country. Currently there are approximately 6 square kilometers (2 square miles) remaining to be surveyed. TMAC estimates that approximately 15 square kilometers (6 square miles) are contaminated by mines.

Prioritizing Funding

Because of a need to prioritize limited funding, mine-action programs often have difficulty reaching an appropriate end state. As a result, the Tajikistan Mine Action Programme, which encompasses the mine-action center,



This area in Shuroobod district is perfect for mechanical demining machines and very difficult for manual clearance. Due to the lack of machines, TMAC must clear it manually. PHOTO COURTESY OF THE AUTHOR

government ministries and mine-action nongovernmental organizations in Tajikistan, prioritizes limited funding to reach an end state as soon as possible. Therefore, 80 percent of mine-action funding in the Tajikistan program goes toward mine-clearance operations and the other 20 percent is used for capacity building, mine-risk education and victim-assistance activities. Approximately 5–6 percent of mine-clearance funding goes to land release by survey teams.

Land-release Results

Since the beginning of operations, Tajikistan has made great efforts to release SHAs. As of December 2008, the TMAP has released 44,538,387 square meters (11,006 acres) of land, and in the process, has destroyed 9,944 anti-personnel mines, 12 anti-tank mines and 1,884 pieces of UXO. Of this total, 42,268,367 square meters (10,445 acres) were released as safe through resurvey and land-release projects and

2,279,020 square meters (563 acres) were released through clearance. During resurvey operations, 18 SHAs were cancelled because they were found to be safe, and 92 new mined areas with an approximate size of 2,925,746 square meters (723 acres) were identified.

According to the Tajikistan National Mine Action Standards, all mined areas or SHAs should be 100-percent cleared. Surveys of cleared areas showed that cleared lands are being used by the local population for agriculture, gardening, pasturing, etc. According to conversations with local authorities and inhabitants, as a result of observing clearance operations, people are confident that cleared lands are safe for use and that all landmines and UXO have been removed.

Conclusion

Considering the potential errors in the initial surveying process, it is an absolute necessity to resurvey SHAs if the land is ever released. Despite

limited funding, minimal equipment and inexperience, allocating funds for surveys to ensure full clearance is a highly productive enterprise, especially when contrasted with the startling alternative. ♦

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Parviz Mavlonkulov is Operations Manager for the Tajikistan Mine Action Centre. He is also a 2007 graduate of the United Nations Development Programme Mine Action Senior Managers' Course delivered by the Mine Action Information Center at James Madison University.

Parviz Mavlonkulov
Operations Manager
Tajikistan Mine Action Centre
Tel: +992 37 227 09 47
E-mail: parviz.mavlonkulov@undp.org or parvizik@gmail.com
Web site: <http://www.mineaction.tj>

Common Terms and Definitions

Anti-personnel Mine Ban	See Ottawa Convention.
CCW, Amended Protocol II	Protocol II of the Convention on Certain Conventional Weapons, amended 3 May 1996, to strengthen its provisions, addresses the effects of mines and booby traps on civilians after conflicts end.
CCW, Protocol V	Protocol V of the Convention on Certain Conventional Weapons addresses the effects of explosive remnants of war, including unexploded cluster munitions, on civilians after conflicts end.
Convention on Certain Conventional Weapons (CCW or CCCW)	<i>Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects</i> was opened for signature in Geneva, Switzerland, on 10 October 1980. For more information: http://disarmament.un.org/ccw/ .
Convention on Cluster Munitions (CCM)	A complete ban on cluster munitions with victim-assistance and decontamination information standards, the CCM was adopted in Dublin by 107 states on 30 May 2008. See also Oslo Process. For more information: http://www.clusterconvention.org .
Convention on the Rights of Persons with Disabilities	Adopted by the U.N. General Assembly on 13 December 2006, the <i>Convention on the Rights of Persons with Disabilities</i> was opened for signature on 30 March 2007, and entered into force with the 20 th ratification on 3 May 2008. For more information: http://www.un.org/disabilities/ .
Deed of Commitment	<i>The Deed of Commitment for Adherence to a Total Ban on Anti-personnel Mines and for Cooperation in Mine Action</i> is the anti-personnel mine ban for nongovernmental entities, provided by the organization Geneva Call. Geneva Call encourages non-state actors to respect humanitarian norms by signing and adhering to this Deed of Commitment. For more information: http://www.genevacall.org/home.htm .
Department	Departments are subdivided portions of a country, much like a state or province.
Disarmament, Demobilization and Reintegration (DDR)	Considered a successful strategy for peacekeeping operations, <i>disarmament</i> refers to the physical removal of weapons from ex-combatants; <i>demobilization</i> refers to the breaking up of armed groups; and <i>reintegration</i> entails the reintroduction of former combatants to society without the threat of future armed conflict.
Explosive Remnants of War (ERW)/Landmines	Some organizations consider mines and explosive remnants of war to be two separate entities, since they are regulated by different legal documents (the former by the Ottawa Convention and Amended Protocol II of the Convention on Certain Conventional Weapons, the latter by CCW Protocol V). However, since mines are explosive devices that have similar effects to other ERW, and it is often impossible to separate the two during clearance operations, some in the community have adopted a “working definition” (as opposed to a legal one) of ERW. This working definition is a blanket term that includes mines, UXO, abandoned explosive ordnance and other explosive devices.
Geneva Conventions	The Geneva Conventions are international treaties on the laws of the conduct of war. For more information: http://www.genevaconventions.org/ .
Human Development Report	This report is an annual milestone publication by the United Nations Development Programme. For more information: http://hdr.undp.org .
International Mine Action Standards (IMAS)	The IMAS provide the framework of international standards and guidelines for mine clearance and were developed to improve effectiveness, efficiency and safety in mine action. For more information: http://www.mineactionstandards.org .
Irregular Warfare (IW)	According to the U.S. Department of Defense, irregular warfare is “A violent struggle among state and non-state actors for legitimacy and influence over the relevant populations. IW favors indirect and asymmetric approaches, though it may employ the full range of military and other capabilities, in order to erode an adversary’s power, influence, and will.” For more information: http://www.fas.org/irp/doddir/dod/iw-joc.pdf
Land Release	According to the most recent IMAS (8.20 Draft Edition, 10 June 2009), the term <i>Land Release</i> describes the process of applying all reasonable effort to identify or better define Confirmed Hazardous Areas and remove all suspicion of mines/ERW through Non-technical Survey, Technical Survey and/or clearance. The criteria for “all reasonable efforts” is defined by the national mine-action authority. See also <i>International Mine Action Standards (IMAS)</i> , <i>Non-technical Survey</i> , <i>Technical Survey</i> .
Landmine Impact Survey (LIS)	A LIS is a community-based national survey that measures the extent of the impact of the landmine problem in a country, based on the number of recent victims, socioeconomic blockages and type of munitions.
Landmine Monitor	Landmine Monitor is an initiative providing research for the International Campaign to Ban Landmines and the Cluster Munitions Coalition. Landmine Monitor provides systematic monitoring and assessment of the international community’s response to the problem caused by landmines, cluster munitions and other explosive remnants of war. Landmine Monitor publishes annual reports in October that detail the landmine and ERW developments during the past year. For more information: http://lm.icbl.org .

Meetings of States Parties (abbreviated 8MSP, 9MSP, etc)	The Meeting of State Parties is a formal meeting of the Member States that have accepted the 1997 <i>Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on Their Destruction</i> . For more information: http://www.apminebanconvention.org/meetings-of-the-states-parties .
Millennium Development Goals (MDGs)	On 18 September 2000, the United Nations General Assembly adopted Resolution 55/2, the <i>United Nations Millennium Declaration</i> . At the United Nations Millennium Summit, world leaders agreed to a set of time-bound and measurable goals and targets for combating poverty, hunger, disease, illiteracy, environmental degradation, and discrimination against women. Placed at the heart of the global agenda, they are now called the Millennium Development Goals. The Summit’s Millennium Declaration also outlined a wide range of commitments in human rights, good governance and democracy. For more information: http://www.un.org/millennium .
Mine-free/Mine -safe or Impact-free	Some countries and mine-action organizations are urging the use of the term <i>mine-free</i> , while others are espousing the term <i>mine-safe</i> or <i>impact-free</i> . <i>Mine-free</i> connotes a condition in which all landmines have been cleared, whereas the terms <i>mine-safe</i> and <i>impact-free</i> refer to the condition in which landmines no longer pose a credible threat to a community or country.
Munitions List	For more information on individual munitions, see the Mine Action Information Center’s “Munitions Reference.” Available at: http://maic.jmu.edu/journal/supplemental/munitions/munitions.asp .
Nairobi Summit	The <i>Nairobi Summit on a Mine-Free World</i> held 29 November–3 December 2004, is the name given to the First Review Conference of the <i>Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-personnel Mines and on Their Destruction</i> . The summit, a gathering of various high-ranking political representatives throughout the international community, focused on the examination of the problems caused by anti-personnel mines and the appropriate actions needed to address the landmine situation across the globe. For more information: http://www.reviewconference.org/fileadmin/pdf/review_conference/press_room/Nairobi_Summit_Highlights.pdf .
Non-technical Survey	According to the most recent IMAS (8.20 Draft Edition, 10 June 2009), Non-technical Survey involves collecting and analyzing new and/or existing information about a hazardous area. Its purpose is to confirm evidence of a hazard or not, to identify the type and extent of hazards within any hazardous area and to define, as far as possible, the perimeter of the actual hazardous areas without physical intervention. A Non-technical Survey does not normally involve the use of clearance or verification assets. See also <i>International Mine Action Standards (IMAS)</i> , <i>Technical Survey</i> , <i>Land Release</i> .
Oslo Process	The Oslo Conference on Cluster Munitions, also known as the Oslo Process, was the first step in a process toward creating an international ban on cluster munitions. See also <i>Convention on Cluster Munitions</i> (CCM). For more information: http://www.noruega.no/policy/Oslo+Conference+on+Cluster+Munitions.htm .
Ottawa Convention	The <i>Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-personnel Mines and on Their Destruction</i> , was opened for signature in Ottawa, Canada, 3 December 1997, and is commonly known as the Ottawa Convention. For more information: http://www.icbl.org/treaty/text/english .
Ottawa Convention, Article 4	Article 4 of the Ottawa Convention requires each signatory to destroy or ensure the destruction of all stockpiled mines it owns or possesses, or that are under its jurisdiction or control, as soon as possible but not later than four years after the Convention is in force for that State Party. For more information: http://www.icbl.org/treaty/text/english#4 .
Ottawa Convention, Article 5	Article 5 of the Ottawa Convention requires that signatories identify all mined or mine-suspected areas; ensure these areas are marked, monitored and protected to effectively exclude civilians; and destroy or ensure destruction of all mines in these areas as soon as possible and no later than 10 years after the Convention’s entry into force for that State Party. For more information: http://www.icbl.org/treaty/text/english#5 .
Small Arms/Light Weapons (SA/LW)	Among conventional weapons, SA/LW are particularly problematic as they are relatively simple to use and are easily accessible. The term “small arms” refers to a category of weapons designed for individual use, including pistols, machine and submachine guns, assault rifles, and hand grenades, among others. “Light weapons” typically include conventional weapons designed for operation by a group of two or more individuals (although they may be operated by individual combatants as well). These weapons include heavy machine guns, grenade launchers, anti-tank missiles and rocket systems, and man-portable air-defense systems (MANPADS). Moreover, they are often the weapons of choice of non-state actors, including terrorist organizations and paramilitary insurgents.
Technical Survey	According to the most recent IMAS (8.20 Draft Edition, 10 June 2009), Technical Survey is a detailed intervention with clearance or verification assets into a Confirmed Hazardous Area, or part of a CHA. It should confirm the presence of mines/ERW, leading to the definition of one or more defined hazardous areas, and may indicate the absence of mines/ERW, which could allow land to be released when combined with other evidence. See also <i>International Mine Action Standards (IMAS)</i> , <i>Non-technical Survey</i> , <i>Land Release</i> .

A Conversation about Land Cancellation and Release with H. Murphey "Murf" McCloy, Stevens [from page 11]

1. The Handheld Standoff Mine Detection System, or HSTAMIDS, is the U.S. Army's dual-sensor, handheld detector that combines an electromagnetic induction sensor and ground-penetrating radar to detect landmines. <http://tinyurl.com/hstamids>. Accessed 22 July 2009.
2. IMAS 08.20: *Land Release*, Draft First Edition, New York, NY. (10 June 2009). <http://tinyurl.com/ktrnbb>. Accessed 21 July 2009.
3. IMAS 04.10: *Glossary of Mine Action Terms, Definitions and Abbreviations*, Second Edition, United Nations Mine Action Service (1 January 2003). <http://tinyurl.com/3vzbw5>. Accessed 21 July 2009.
4. IMAS 08.21: *Non-technical Survey*, Draft First Edition, UNMAS (10 June 2009). <http://tinyurl.com/ns5ogp>. Accessed 21 July 2009.
5. IMAS 08.22: *Technical Survey*, Draft First Edition, UNMAS (10 June 2009). <http://tinyurl.com/nvf875>. Accessed 21 July 2009.
6. IMAS 09.10: *Clearance Requirements*, Second Edition, UNMAS (1 January 2003). <http://tinyurl.com/qhsj7v>. Accessed 21 July 2009.
7. "Applying all Available Methods to Achieve the Full, Efficient and Expedient Implementation of Article 5." Resource Utilization Contact Group (30 May 2008). <http://tinyurl.com/ktsz2o>. Accessed 21 July 2009.

Survey and Land Release: Lessons from Recent Country Experience, Downs [from page 18]

1. NPA–Angola, "Land Release Concept Paper," internal document, 2008: 9.
2. The mean number of mines found per hectare treated by Technical Survey or clearance, however, has fluctuated more widely, and in one case it was actually lower in 2005 and 2007 than it had been prior to the introduction of Technical Survey. This suggests that while Technical Survey has improved the narrowing of limits on the actual mined areas cleared, General Survey may have become less effective and now includes larger areas for Technical Survey than it left previously for clearance. <http://www.npaid.org/>. Accessed 8 July 2009.
3. GICHD Publication No. 64: *A Guide to Land Release: Non-technical Methods*. Geneva International Centre for Humanitarian Demining, Geneva, Switzerland (November 2008). <http://tinyurl.com/nmevzl>. Accessed 8 July 2009.
4. A higher concentration of mines reflects improved targeting of clearance assets.
5. Fewer tasks without finding any mines reflects improved release of non-mined areas and better targeting of clearance of mined areas.
6. *International Mine Action Standards*. United Nations Mine Action Service. <http://tinyurl.com/imas8>. Accessed 8 July 2009.

Is it Time for New Terminology in Land Release and Technical Survey?, Keeley [from page 25]

1. IMAS 08.20: *Technical Survey*, Second Edition, United Nations Mine Action Service, New York, NY (1 January 2003). <http://tinyurl.com/c48fnt>. Accessed 22 July 2009.
2. A list is effective when it is (a) exhaustive (i.e., contains everything) and (b) mutually exclusive (i.e., when an item can only appear in one category in the list). The list at Table 1 fulfills both these criteria.

Land-release Policies and Human-security Complexities, Björk [from page 29]

1. Munro-Faure, L., Munrou-Faure, M. and Bones, E. (1995). *Achieving the New International Quality Standards* (London, Pitman Publishing). <http://tinyurl.com/l8lyxm>. Accessed 14 July 2009.
2. Jaynes, J. (2002). *Risk Management* (Oxford, Butterworth-Heinemann). <http://tinyurl.com/mbd4wn>. Accessed 14 July 2009.
3. GICHD Publication No. 64: *A Guide to Land Release: Non-technical Methods*. Geneva International Centre for Humanitarian Demining, Geneva, Switzerland (November 2008). <http://tinyurl.com/nmevzl>. Accessed 8 July 2009.
4. ISO 9000 is a family of management-system standards by the International Organization for Standardization concerning quality management. ISO 9000 outlines an organization's responsibility to implement "the customer's quality requirements and applicable regulatory requirements, while aiming to enhance customer satisfaction and achieve continual improvement of its performance in pursuit of these objectives." ISO 9000 and ISO 1400: International Organization for Standardization. (2009). <http://tinyurl.com/2ely7u>. Accessed 14 July 2009.
5. Barakat, S. (ed). (2005). *After the Conflict* (New York, Palgrave MacMillan). <http://tinyurl.com/kjhx7a>. Accessed 14 July 2009.

Gender and Land Release: The Responsibility of the Mine-action Community, Nilsson, Rozès, García [from page 34]

1. The World Bank, the Food and Agriculture Organization of the United Nations, and the International Fund for Agricultural Development: *UN Gender in Agriculture Sourcebook*, Washington, D.C. (2009). <http://tinyurl.com/nbr2v>. Accessed 31 July 2009.
2. Rural Development Institute: "When Women Own Land, We All Benefit" (fact sheet). <http://tinyurl.com/klhwt2>. Accessed 29 July 2009.
3. UNHCR Handbook for the Protection of Women and Girls, Geneva, (January 2008): 9,330. <http://tinyurl.com/lleSeg>. Accessed 29 July 2009.
4. GICHD Publication No. 64: *A Guide to Land Release: Non-technical Methods*. Geneva International Centre for Humanitarian Demining, Geneva, Switzerland (November 2008). <http://tinyurl.com/nmevzl>. Accessed 8 July 2009.

5. IMAS 08.20: *Land Release*, First Edition, United Nations Mine Action Service (10 June 2009). <http://tinyurl.com/ktrnbb>. Accessed 21 July 2009.
6. Report of the Special Rapporteur on Violence against Women, "Integration of the Human Rights of Women and the Gender Perspective: Violence against Women," E/CN.4/2000/68 (January 2003). <http://tinyurl.com/ms7st7>. Accessed 29 July 2009.

Clearing Areas Right; Clearing the Right Areas, Bach [from page 46]

1. "IMAS: What's New" (June 2009). *International Mine Action Standards*. <http://tinyurl.com/o5r7o2>. Accessed 21 July 2009.

Could Local Agricultural Machines Make a Country 'Impact Free' by 2010?, Cepolina and Zoppi [from page 52]

1. Vadim. "Hunger to Replace Energy Crisis." *Neueurasia*. (March 2008). <http://tinyurl.com/cqxxzv>. Accessed 13 May 2009.
2. Iacobucci, Andrew. "Tajikistan: Almost One-Third of the Population is in Danger of Going Hungry This Winter." *Eurasia Insight*. (7 October 2008). <http://tinyurl.com/4hello>. Accessed 11 May 2009.
3. IMAS 08.20: *Land Release*, Draft First edition, United Nations Mine Action Service, New York, NY (10 June 2009). <http://tinyurl.com/ktrnbb>. Accessed 21 July 2009.
4. IMAS 09.10: *Clearance Requirements*, Second Edition, UNMAS, New York, NY (1 January 2009). <http://tinyurl.com/lqhsj7v>. Accessed 11 May 2009.
5. GICHD Publication No. 64: *A Guide to Land Release: Non-technical Methods*. Geneva International Centre for Humanitarian Demining, Geneva, Switzerland (November 2008). <http://tinyurl.com/nmevzl>. Accessed 8 July 2009.
6. *Mechanical Demining Equipment Catalogue 2008*. Geneva International Centre for Humanitarian Demining. <http://tinyurl.com/lqkve3>. Accessed 14 July 2009.
7. Cepolina, E.E., C. Bruschini, and K. De Bruyn (2004). *Field Survey Results*. EUEM2 internal publication. <http://tinyurl.com/d5phol>. Accessed 12 May 2009.
8. Smith, A.V. (2009). *Generic SOPs*. <http://tinyurl.com/c79w85>. Accessed 13 May 2009.
9. "Farm Machinery and Primary Processing." National Bank for Agriculture and Rural Development (NABARD) (2007). <http://tinyurl.com/cvmt65>. Accessed 12 May 2009.
10. According to NABARD, this is the estimated power needed to significantly improve agricultural activities in India.
11. Cepolina, E.E. (2006). "Power Tillers and Snails for Demining in Sri Lanka." *Journal of Mine Action*, Issue 10.1. (Summer 2006: 76–79). Available at <http://tinyurl.com/ma6jny>. Accessed 12 July 2009.
12. Kostorzewski, S., R.D. Apputhanthri, J. Masood, and E. E. Cepolina. "Portable Mechatronic System for Demining Applications: Control Unit Design and Development." *Proceedings of the International Symposium on Humanitarian Demining 2007 – Mechanical Demining*, 24–27. (April 2007). Sibenik, Croatia. Available at <http://tinyurl.com/mftt99>. Accessed 12 July 2009.
13. Eriksson, D. (2008). "Total Quality Management in Mine Action." *Journal of Mine Action*, Issue 12.1. (Summer 2008: 80–83). Available at <http://tinyurl.com/mj9ja2>. Accessed 12 July 2009.
14. "Bosnia and Herzegovina." *Landmine Monitor Report 2008*. <http://tinyurl.com/m4zc6b>. Accessed 14 July 2009.
15. *Earth Trends: Environmental Information*. World Resource Institute (WRI). (2007). Washington, D.C. <http://earthtrends.wri.org>. Accessed 12 May 2009.

Reflections from the Field: Lao PDR, Surveys and Land Release, Pritchard [from page 57]

1. This was a Non-technical Survey team, collecting and analyzing new and extant information on the specific hazard area.
2. Polygons are a geo-spatial visual representation on a map of specific areas of interest, such as minefields or suspected areas containing UXO.
3. The 80/20 Rule, also known as the Pareto Principle, states that 80 percent of effects should be credited to 20 percent of causes.

Land Cancellation and Release, Mavlonkulov [from page 59]

1. Davlyatova, Shahriniso. "Gender in Mine Action: The Tajikistan Experience." *The Journal of ERW and Mine Action*, Issue 12.2 (Winter 2008: 36-37). <http://tinyurl.com/mukcna>. Accessed 29 July 2009.